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IN THIS ISSUE

Instrumentation for Ultrahigh Speed Techniques 56

Evaluation of the Transograph 60

Technique for the Determination of Vertical Dimension as an Important Step in Obtaining Centric Occlusion 63

Portable Steam Sterilizer 68

Clay Preparation for Functional Trim of the Complete Lower Impression 70

Capillary Hemangioma of the Gingiva: Case Report 73

Clinical and Laboratory Suggestions 76

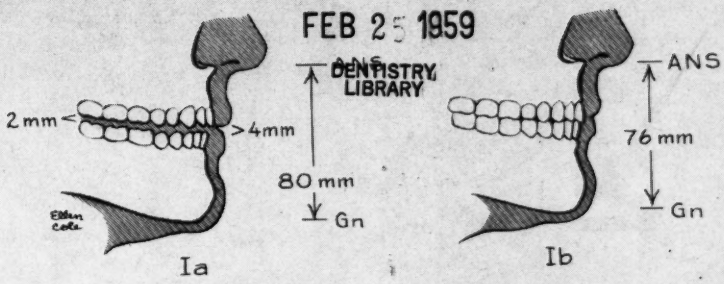
The Editor's Page 78

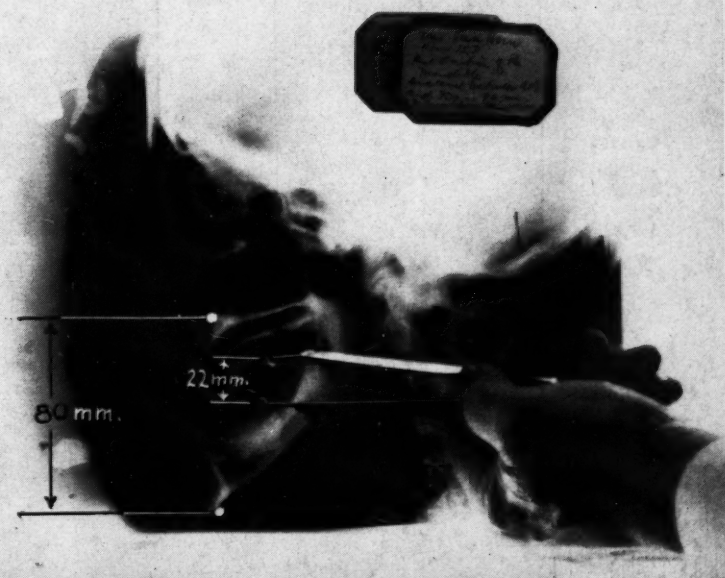
Medicine and the Biologic Sciences 79

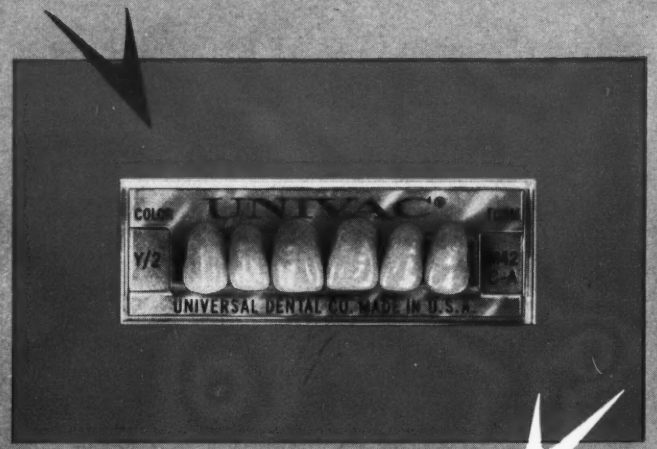
Contra-Angles 90

(A Complete Table of Contents Appears on page 55)

Cover illustration—Mintz article, page 63







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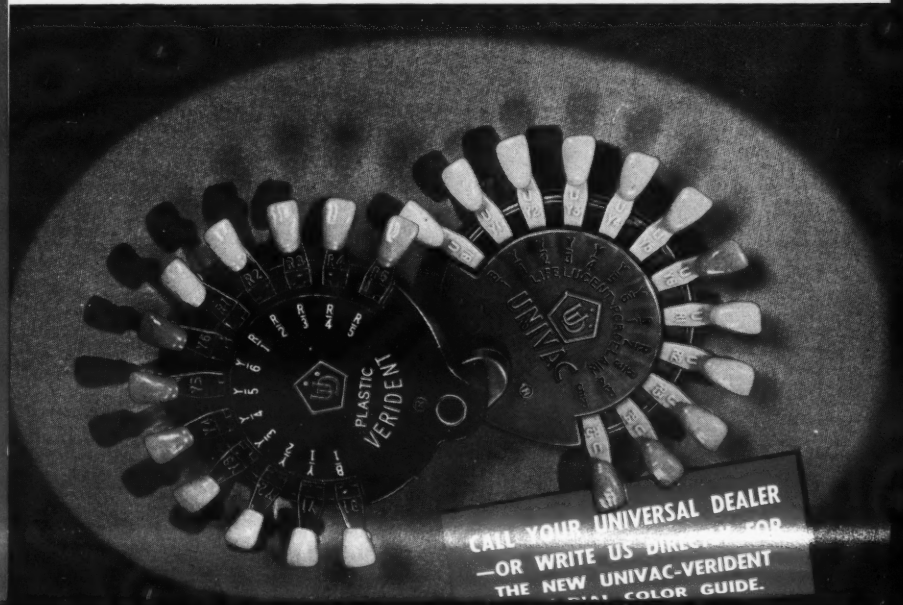

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Instrumentation for Ultrahigh Speed Techniques
Gordon S. Anker, D.D.S. 56

An Evaluation of the Transograph
Alex R. Kossoff, D.D.S., and Max D. Hoffman, D.D.S. 60

Sweet Tooth and Decay (An Abstract) 62

A Technique for the Determination of Vertical Dimension as an Important Step in Obtaining Centric Occlusion
Samuel Mintz, D.D.S. 63

An Evaluation of the Problem of Galvanic Currents in the Oral Cavity
Ralph W. Phillips, M.S. (An Abstract) 67

Portable Steam Sterilizer
Harry K. Ihrig, B.S., M.S., Ph.D. 68

Tray Preparation for Functional Trim of the Complete Lower Impression
Wilson W. Chase, D.D.S., and Robert G. Vig, D.D.S. 70

Radiation Hazards Resulting from the Use of Dental X-ray Machines (An Abstract) 72

Capillary Hemangioma of the Gingiva: Case Report
Louis Charles Eskin, B.S., D.D.S., M.S.D. 73

Clinical and Laboratory Suggestions 76
1. Flaring a Copper Band. 2. Glazing a Facing With a Blowtorch. 3. Shortening an Airotor® Bur. 4. An Aid to Seating Inlays. 5. Model Identification. 6. Removal of Excess Cement From a Bridge.

The Editor's Page 78

Medicine and the Biologic Sciences 79

Contra-Angles 90

Clinical Uses of the Ultrasonic Root Scalers
S. J. Ewen, and P. J. Tascher (An Abstract) 92

Measurement in Medicine
Max Hamilton, M.D. (An Abstract) 92

Common Sense Approach to the Problem of Genetic Hazard Due to Diagnostic Radiology
W. Daggett Norwood, M.D. (An Abstract) 96

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See your Universal Dealer

Instrumentation for ULTRAHIGH SPEED *Techniques*

GORDON S. ANKER, D.D.S.,
Toronto

DIGEST

High speed instrumentation has provided the dentist with an easier and more efficient method of preparing tooth structure. There is frequently a question, however, concerning the equipment and the technique best suited to achieve the most desirable results. This article reviews the steps leading to the final development of ultrahigh speed instrumentation, and enumerates the specific instruments that have been found of greatest use over a period of years, including directions for particular applications of each one.

Departure from Basic Principles

Three types of tooth structure removal equipment have been made available to the dental profession in recent years. Two of these are comparatively recent and have had limited favor because they represent a departure from basic principles taught in dental colleges:

1. The first instrument which departed from conventional instrumentation was the Airdent.® This apparatus utilized a sand-blasting principle whereby aluminum oxide particles were carried by a stream of carbon dioxide gas. This method received extremely limited acceptance by the profession.

2. The second was an ultrasonic vibrating instrument which utilized a slurry of aluminum oxide, introduced into the path of the vibrating instrument. This instrument enjoys a measure of popularity, with enthusiastic support by those who use it.

Evaluation of Rotary Instruments

During the period of development of the Airdent and the ultrasonic instrument, a number of dental manufacturers turned to the principle of increased rotational speeds for existing rotary cutting instruments, (1) to increase the efficiency of the rotary instrument, (2) to reduce the pressure necessary to affect both structure removal, and (3) increase the comfort of the patient.

Factors Controlling Efficiency — The efficiency of any instrument used in the rotational group is related to the amount of material cut per given unit of time under a given load. The actual amount of removed material is dependent upon four factors:

1. Design and composition of the cutting instrument.
2. Speed of rotation.
3. Applied pressure.
4. The use of a lubricant on the cutting tip.

Tungsten Carbide Utilized—It was found that the steel bur dulled rapidly at the increased speeds. Tungsten carbide, a much harder metal, was utilized for the cutting part of the instrument.

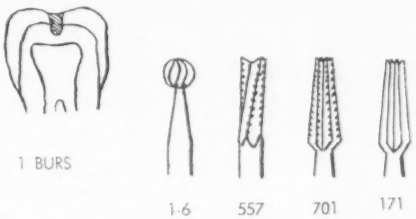
Cutting Edges Reduced: The number of cutting edges on the bur itself had been progressively reduced from ten to six thereby permitting the instrument to clear itself more rapidly so that each blade was in position to do an efficient cutting job upon contacting the tooth.

Obstacle Overcome: The early days of the tungsten carbide bur were notable for the number of burs which fractured in use, but as the dentist adapted himself to the lighter touch requirements of the increased speeds, this drawback has almost completely disappeared.

Selection of Diamond Instruments —The diamond instrument has kept pace with these developments and this instrument too has a certain standard of manufacturing quality essential to proper performance. In selection of diamond instruments for high and ultrahigh speed techniques the following three factors are important:

1. The quality of the diamond abrasive.

2. The particle size of the diamond abrasive and its uniformity.



CLASS I

1 BURS

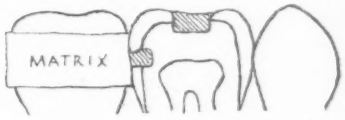
1-6 557 701 171

2 DIAMONDS

a. Hollow core
b. Miniature

Round burs for soft decay

1



CLASS II

CARBIDE BURS
701, 557, 171

Create step—leave a thickness of ½mm. or use a matrix

DIAMOND INSTRUMENTS
Miniature diamonds

2

CLASS III

CARBIDE BURS

Round 1 and 2, or inverted cone 34 and 35
Finish—Chisels

3

CLASS IV

CARBIDE BURS

Create incisal with inverted cone 35 or 701 or 557
Finish with a parallel miniature diamond
Finish with excavators

4

CLASS V

CARBIDE BURS—No. 34 or 36

DIAMONDS—Inverted cone or parallel miniature
Finish with excavators

5

3. The method by which the diamond is bonded to the instrument blank.

The higher the speed utilized, the finer the particle size (or grit) necessary to produce efficient cutting. The coarser the grit, the more uneven and fewer will be the individual cutting points projecting from the instrument. At high speed, this will not only reduce efficiency, but will contribute to irritating vibration.

Factors in High Speed Ranges

In the field of rotary cutting instruments there are three plateaus of speed above 6,000 rpm or what has until now been considered to be the conventional speed. Each plateau has been found to have its own distinct advantages, and special instruments are required to achieve optimum efficiency for each of these speeds. The observations presented here are based upon the performance of the equipment and cutting instruments made available by manufacturers for the various speed ranges during the past three and one-half years.

The First Speed—Up to 25,000 rpm will be referred to as increased speed. This was easily achieved by increasing the ohms resistance of the resisters in the dental engine, plus a larger diameter drive pulley wheel, with the addition of a handpiece built to precision tolerances utilizing hardened steel bearings.

Benefits: In this speed range (1) the cutting efficiency of the carbide bur, (2) the cutting efficiency of the diamond, was improved, and (3) the pressure required to cut was reduced. A reduced pressure also reduced vibration and increased patient comfort.

Water Coolant Used: These speeds made the use of a coolant in the form of a water spray absolutely necessary, to avoid hazardous temperature rises, and the dentist was then faced with decreased visibility.

Daily Cleaning and Lubrication Required: In this speed range, the handpiece required constant daily cleaning and lubrication, thereby adding an-

other obligation to the dental office.

The Second Speed — This range, designated as "high speed" lies in the 35,000 to 45,000 rpm range. The only practical means of achieving this speed with a dental engine has been with a handpiece incorporating a speed-increasing pulley arrangement at the wrist joint. In this speed range, the maximum practical time possible to save in cavity preparation, and crown and bridge procedure has been achieved.

Cleaning and Maintenance Problem Accentuated—This step-up of the conventional type dental handpiece, to which ball-bearings have been added to permit these high speeds, made the cleaning and maintenance problems even more difficult. What had been a daily procedure with increased speed now became a procedure recommended after each patient, and in the case of multiple preparations between preparations.

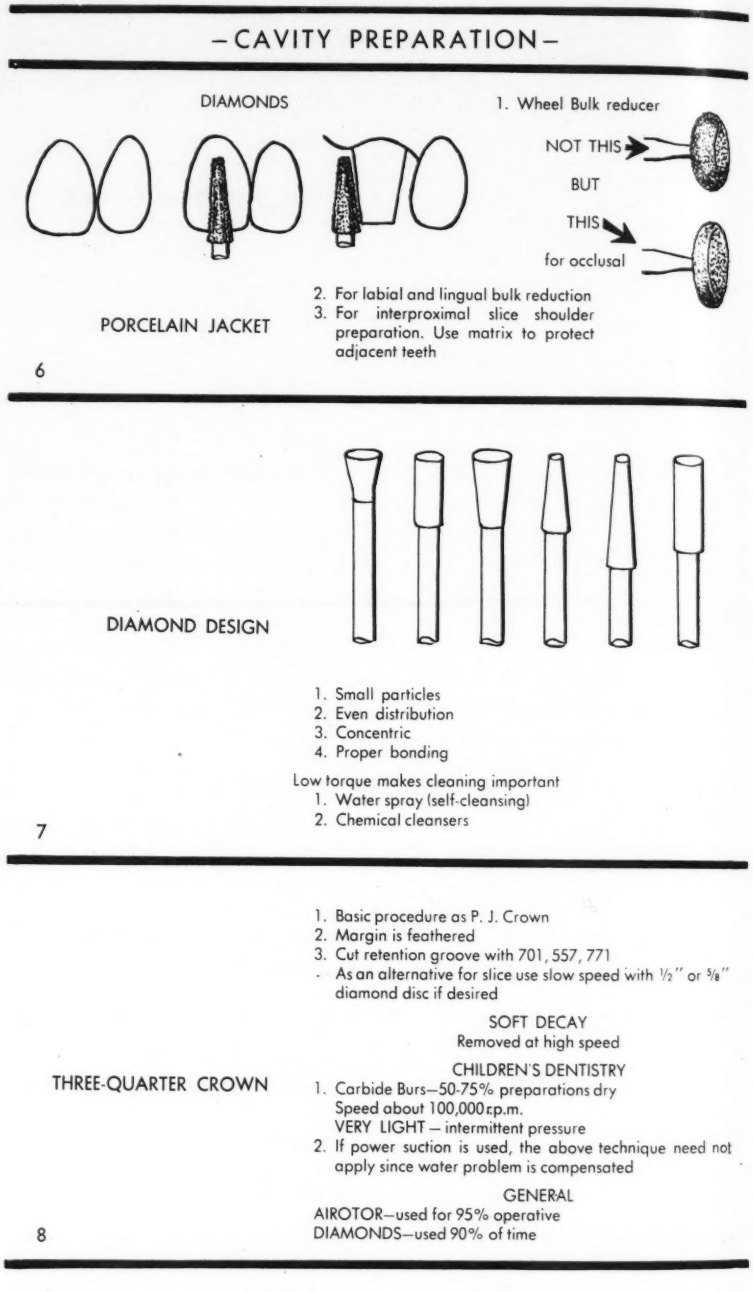
Carbide Bur Provided Average Efficiency: The water turbine type of instrument which eliminated tension and pulley noise and belt-induced vibration has been the most efficient method of achieving 45,000 rpm. In this speed range it was found that the carbide bur proved to be of no greater efficiency than its performance in the increased speed range.

Diamond Instrument Increased Patient Tolerance and Speed: It was found, however, that the diamond instrument reduced tooth structure more rapidly and with less pressure and that with the use of various discs, knife-edged wheels, and inverted cone-shaped diamonds, it was possible to make an interproximal slice of the enamel and outline a cavity rapidly. The use of the diamond instrument in this range increased patient tolerance and comfort and multiple cavity preparation or extensive bridge preparation could be carried out at each appointment.

The Third Speed—From the high speed range, progress was made to the ultrahigh speed range which referred to revolutions of the order of 100,000 rpm and up. Since current trends dwell chiefly in this plateau this paper deals mainly with instrumentation for these speeds. This speed range offers all the advantages of the high speed plateau and has many additional benefits as well.

Preferred Instrument—Of the instruments capable of delivering ultra-high speeds, it was demonstrated that the Page-Chayes® handpiece was the most effective of the belt-driven type, and the Airotor® the choice of the air and water types of turbine available.

Substitution of Metal Bushing — One essential development for ultra-high speed operation has been the inclusion of a rubber or plastic chuck to lessen vibration and to provide a certain amount of freedom to the cutting instrument itself which caused a different and more rapid cutting action. It was found that if the chuck was removed and for it a metal bushing substituted which resulted in a metal-to-metal contact, the cutting efficiency of a No. 557 carbide bur was appreciably reduced, compared to


– CAVITY PREPARATION –
DIAMONDS
1. Wheel Bulk reducer
NOT THIS
BUT
THIS
for occlusal
2. For labial and lingual bulk reduction
3. For interproximal slice shoulder preparation. Use matrix to protect adjacent teeth
PORCELAIN JACKET
6
DIAMOND DESIGN
1. Small particles
2. Even distribution
3. Concentric
4. Proper bonding
Low torque makes cleaning important
1. Water spray (self-cleansing)
2. Chemical cleansers
7
1. Basic procedure as P. J. Crown
2. Margin is feathered
3. Cut retention groove with 701, 557, 771
As an alternative for slice use slow speed with ½" or ⅝" diamond disc if desired
SOFT DECAY
Removed at high speed
CHILDREN'S DENTISTRY
THREE-QUARTER CROWN
1. Carbide Burs—50-75% preparations dry
Speed about 100,000 r.p.m.
VERY LIGHT — intermittent pressure
2. If power suction is used, the above technique need not apply since water problem is compensated
GENERAL
AIROTOR—used for 95% operative
DIAMONDS—used 90% of time
8

both belt-driven and turbine instruments at 180,000 rpm. In addition, the vibration was extreme whereas with the rubber or plastic insulation the vibration was almost nonexistent.

Adaptive Features in High Speed

It was found that the Page-Chayes handpiece would provide a speed range of 15,000 rpm up to ultrahigh speed, and because ordinary hand pressures would not stop the cutting instrument, it was easier to use. The torque of this instrument permitted the use of half-inch and five-eighths inch discs for slice preparations at speeds of 80,000 rpm. It was also found that the Page-Chayes instrument, using a vapor spray type of coolant, did not induce thermal shock. However, still present with this handpiece was the belt and pulley arrangement which has always been objectionable.

Modifications to Provide Warm Water—The air dispelled by the air-turbine, when expanding to atmosphere, acts as any other compressed gas with a refrigerant effect, and certain modifications to the water supply had to be undertaken to provide warm water to offset this action.

Patient Apprehension Lessened—The air-turbine handpiece system has eliminated the feeling of motivation, and contributed greatly to patient comfort by reduction of apprehension. The carbide bur operates better with less pressure and even going from Page-Chayes to air-turbine the patients registered a definite decrease in pressure perception. The possibility of approach of the handpiece below the eyelevel of the patient has a definite psychologic benefit as well.

Diamond Instruments Almost Exclusively Used—It soon became apparent that the instruments which had been designed for much lower speed ranges, were not the best that could be obtained for ultrahigh speed. By process of continual experimentation, and by careful attention to the necessity of developing a feather-light touch, it is now possible to procure diamond instruments which are utilized for approximately 95 per cent of all operative procedures.

Chemical Cleaning Advised—It has been found that with proper diamond design instrumentation can be limited to a few basic shapes in varying sizes and it is emphasized that fine grained instruments enhance the smooth cutting of the diamond. This fine grain combined with the low torque of the air-turbine makes cleaning important and it is essential that a water spray be used as a lubricant and that the diamond instruments be thoroughly cleaned chemically to remove embedded debris.

Instruments Used in Airotor Techniques

The following are the instruments which have been found extremely useful in this practice for crown and bridge construction and cavity preparation.

Preparation—The following instruments are used in specific techniques:

Class I: (1) Opening—knife-edged diamond 2 millimeters diameter, 0.5 millimeter thick. (2) Extension—small cylindrical diamonds, solid or spiral vented. (3) Remove soft caries with round carbide bur. (4) Fully extend preparation *before* establishing depth. This ensures minimum "drag" on the instrument and maximum visibility (Fig. 1).

Class II: (1) Open and extend as for Class I preparation. (2) Interproximal step is created with a small cylindrical diamond 1 millimeter diameter, 7 millimeters long (Fig. 2).

Class III: (1) Carbide burs. (2) Round Nos. ½, 1, or 2. (3) Inverted Cone, Nos. 33½, 34, or 35 as preferred (Fig. 3).

Class IV: (1) Establish labial with a ⅜-inch diamond disc at slower speed, or a small tapered diamond cylinder 1.25 millimeter diameter tapering to 0.75 millimeter, 7 millimeters long. (3) Create outline of lingual with miniature inverted cone diamond (Fig. 4).

Class V: (1) Outline with miniature inverted cone diamond of preferred size. (2) Remove soft caries with round carbide bur. (3) In all cavity preparations, use hand instruments to finish enamel walls (Fig. 5).

Porcelain Jacket Crowns—(1) It is advisable to use a matrix to protect adjacent teeth while making slice. (2) Only two instruments are necessary for this preparation. Using a round edge diamond wheel, 2 millimeters in diameter, 0.5 millimeter thick, reduce incisal. (3) Effect slice, using tapered diamond cylinder referred to in Class IV preparation. (4) Carry this instrument labially and lingually for bulk reduction, simultaneously establishing shoulder as preparation progresses (Fig. 6).

Three-Quarter Crown—Four steps may be taken: (1) prepare mesiodistal slices as outlined under Class IV. (2) Reduce occlusal with 2-millimeter round edge wheel. (3) Reduce lingual with 7-millimeter taper cylinder. (4) Parallel retention grooves may be established with carbide burs 170, 171, or comparable diamond (Fig. 8).

Conclusion

The air-turbine has removed from the dentist the problem of handpiece maintenance which has been a hazard with the use of the ultrahigh speed techniques. The air-seal mechanism of the turbine continues to divert the possible entry of debris or water, and lubrication is achieved automatically by means of oil borne in form of mist with the propelling air. The turbine of a Airotor has been in use continually for a year, in this experience, and in comparison to other makes of ultrahigh speed equipment, the care and maintenance factor has been negligible. During this period the Airotor has been used for all operative procedures.

225 *Danforth Avenue*

An Evaluation of the TRANSOGRAPH

ALEX R. KOSSOFF, D.D.S.,
Cleveland, and

MAX D. HOFFMAN, D.D.S.,
Cleveland Heights, Ohio

DIGEST

There has been for some time a need for an instrument capable of expressing a duplicatable terminal hinge position. The contribution of the Transograph to the dental profession was a valuable addition and was found to fulfill the requirements necessary to create and identify a hinge-axis recording, which could be transferred to the laboratory bench for evaluation, study, and analysis. Recordings made with the Transograph are now almost exact duplications of the patient's jaw movements.

Intelligently handled, the individual functional cyclic movements of the mandible can be brought to the bench without the need of transfer, which eliminates a serious deficiency common to most instruments.

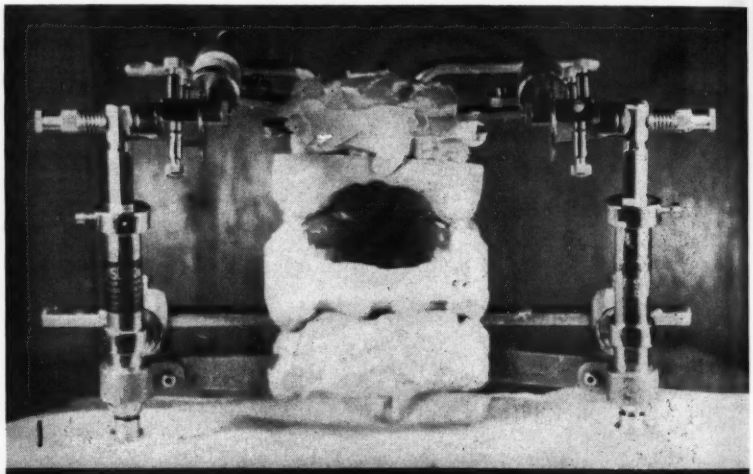
Objective Realized

The objectives that may be accomplished with the proper use of the Transograph® are the proper recording of the following:

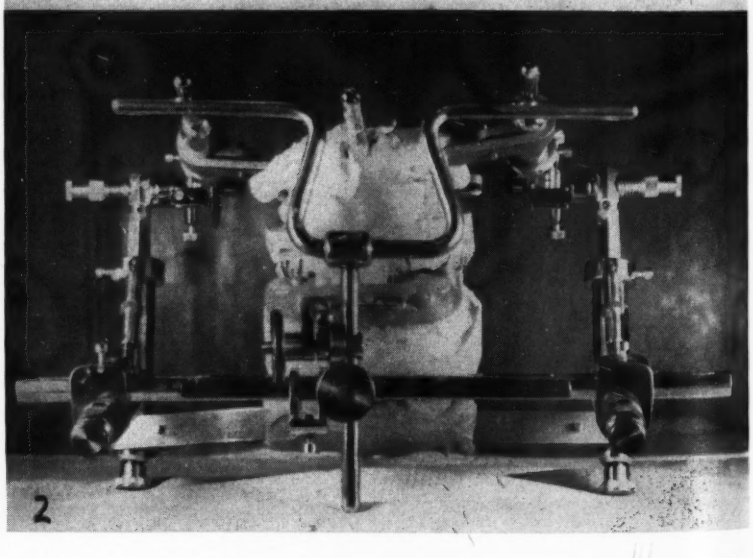
1. The hinge axis (consistently duplicatable)
2. The Bennett movement
3. The cranial plane
4. The split axis

1. *The Hinge Axis*—The ability to obtain a duplicatable hinge axis record as a practical control center is invaluable. This record is used as a measuring index for the starting and finishing position of the mandible in the chewing cycle, and the brace position during the final act of swallowing.

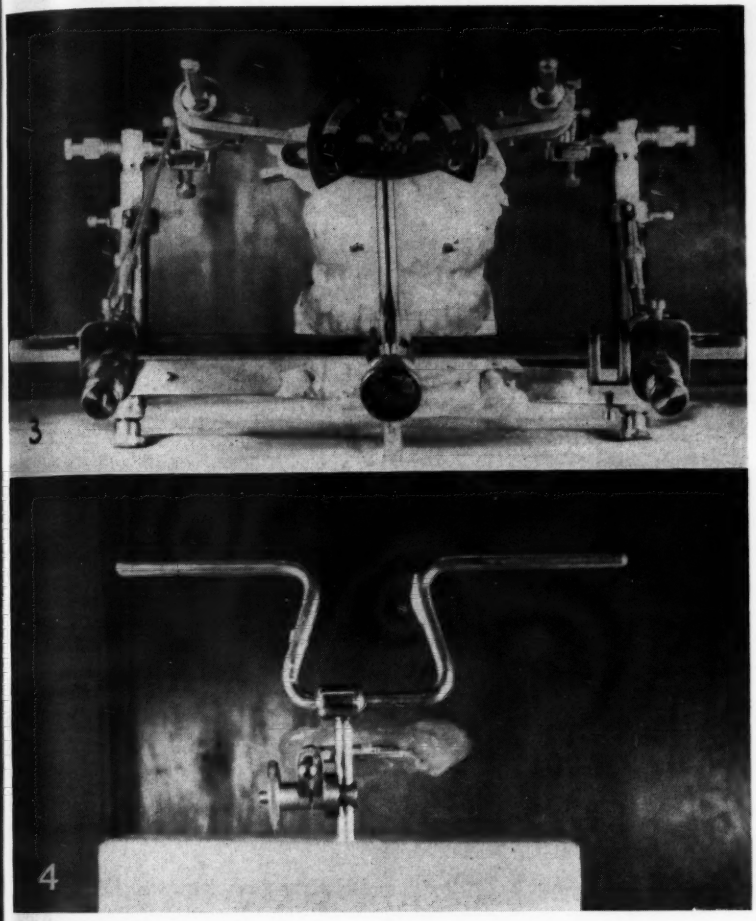
2. *The Bennett Movement* — The



1.
Showing the rear view mounting on the Transograph demonstrating that each condyle is free (split axis concept).



2.
Showing registering device (cranial plane plus mounting bite) becoming part of the articulator.



3.
Showing jaw movement guide cams in place which demonstrates the patient's chewing angle.

4.
Showing cranial plane registering device and bite assembly.

combined lateral and vertical complex which is identified as the Bennett Movement is incorporated into this instrument. Since there are various degrees of Bennett Movement in persons, these must all be incorporated into the instrument in order to complete the envelope of motion. It must be possible to reproduce any motion, no matter how great or slight, in the Transograph, in order to secure proper articulation.

3. *The Cranial Plane*—The Transograph provides an accurate measuring device for a record of off-sagittal movements. This enables the operator to relate with extreme accuracy the position of the maxilla as it exists in relation to the skull.

4. *The Split Axis*—The concept that each condyle is free (Fig. 1) and is not connected by a rigid bar is demonstrated by the Transograph. This is contrary to the concept of the conventional articulator. Casts, mounted by means of fingers, are the only connection.

Useful Features of Device

Functional Chewing Cycles Registered—Failure to consider functional chewing cycles as a basic factor in articulation has been a barrier to total success in establishing articulation with the conventional instruments.

Registration Incorporated—Another asset of the Transograph is that the registering devices become a part of the articulator (Fig. 2) in which are incorporated the hinge-axis, the Bennett Movement, and the cranial plane for the particular patient from whom the records have been taken (Figs. 3 and 4).

Arc of Closure Recorded—The incorporation of these factors represents a record of the arc of closure which remains constant regardless of the degree of vertical opening, provided it is within the patient's hinge range.[1,2]

Functional Pattern of Patient Followed—One operator has stated: "After years of checking the instrument against the mouth in hundreds of cases I find that I can follow the functional pattern of the patient."[3]

Reconstruction Procedures Facilitated—A user of the Transograph described improved technique in a number of procedures: (1) Better bridges can be constructed because they are properly articulated, (2) better dentures completed, and (3) a complete reconstruction can be fabricated and the result will be accurate.[4]

---

[1]Harry Page, Transographics and the Transograph, DENTAL DIGEST **62**:214-219 (May) 1956.
[2]Harry Page, The Cranial Plane, DENTAL DIGEST **61**:152-157 (April) 1955.
[3]Leinfelder, M. J.: Personal communication.
[4]Rader, Albert F.: Personal communication.

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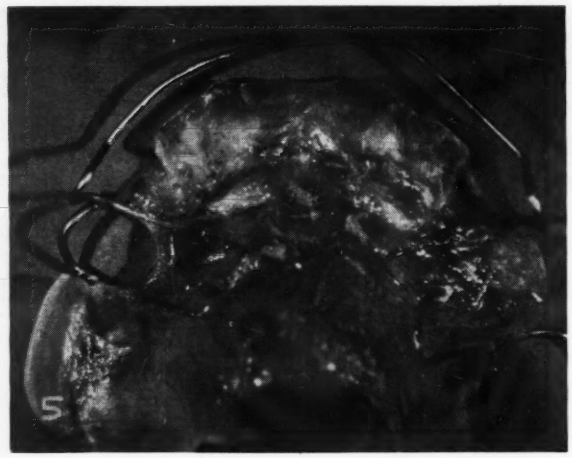


5.
A bite plane with labial wire arm and incisal table to negate posterior occlusion.

Useful Adjunct Introduced

Until the Transograph was used occlusal reconstruction procedures were not consistently successful. The best results, however, have been obtained with the Transograph when the bite plane was used as a preoperative aid in periodontal therapy as suggested by Berliner.[5]

Negation of Occlusal Factor—That a pathologically functioning maxillomandibular relationship must be negated and the musculature be permitted to reestablish isotonic balance, without reference, before a duplicatable hinge position could be established was proposed by Berliner[5] who stated that in clinically valid technique the occlusal factor will be negated during function with use of the Class I bite plane.[3]

Common Disadvantage—Although the Transograph is considered a superior instrument it is unable to locate the terminal hinge position in the presence of a dental abnormality requiring extensive technique.

Bite Plane Therapy Neglected—Harry Page[4] states that the hinge changes: "It is now fairly well established that hinge-axes do change temporarily when forced to do so by prolonged normal articulation." By inserting a bite plane, and allowing the patient to wear it for a short period of time, it is possible to locate the hinge-axis with ease, and this hinge position does not change.

Method Employed

1. A Class I bite plane which has a labial arch wire, 2 cuspid loops, and 2 clasps either on bicuspids or molars, with a flat plane in clear acrylic (Fig. 5) is inserted.

2. The appliance is adjusted so that the lower anterior teeth contact the platform simultaneously while the posterior teeth are not in occlusal contact with each other, but slightly apart and always within the freeway space, with provision for the intercuspal contact in any excursion.

3. This permits freedom of the musculature, and gradual isotonic balance with the jaw returning to its hinge position without any force exerted by the operator.

After wearing the bite plane for one to two weeks the Transograph may be used.

Summary

With the combined use of the bite plane and the Transograph, it is possible to reproduce, capture, and duplicate all functional jaw movements. Efficiency in mastication, comfort, and maintenance of the tissues under appliances, without breakdown, for a longer period of time is ensured.

816 *East* 152*nd Street* (ARK)
1856 *Coventry Road* (MDH)

[5]Berliner, Abraham: Clinical Periodontology, Bite Plane Therapy. Motion Picture. American Dental Association Library. Personal communications.

[4]Page, Harry L.: Temporary Jaw Protrusion—its Causes and Correction, DENTAL DIGEST **62**:20-25 (Jan.) 1956.

Sweet Tooth and Decay

In one African tribe an attack of dental caries is considered sufficient grounds for divorce. If one of the children has decayed teeth he is forbidden to feed from the family pot; he sits forlornly in the corner of the hut and dines alone. Under these rules almost all the marriages in Great Britain would be broken and all but a few children would eat alone, for the incidence of dental caries is so great that scarcely have the teeth erupted before their destruction begins. On the average, a child aged 4 years has at least four bad teeth; each year through childhood one or two teeth are added to the total number affected. It surprises no one, therefore, that the dental profession, now entering the lean years of manpower shortage, is unable to restore more than a small fraction of the children and adolescents to dental health.

Rules for Dental Health

At the 1958 Congress of the Royal Society of Health simple rules for the maintenance of dental health were given:

(1) No eating or drinking between meals.

(2) Regular mealtimes; a planned diet which allows the eating of chocolate and other sweetmeats only at table; the eating of fibrous fruits or vegetables such as apples or carrots at the end of meals to aid physiologic cleansing of teeth.

(3) The encouragement of children by example and instruction to use the bubble and swallow technique of rinsing the mouth with plain water three times after eating and drinking.

(4) Instruction of young children in oral hygiene by parents and teachers showing the value of brushing the teeth, especially last thing at night.

Adapted from *British Medical Journal* No. **5091**:293 (Aug. 2) 1958.

A Technique for the Determination of VERTICAL DIMENSION as an Important Step in Obtaining Centric Occlusion

SAMUEL MINTZ, D.D.S.,
Plainfield, New Jersey

DIGEST

This article describes a technique for recording the mandible in the rest position as an aid to obtain centric position. Step-by-step directions are given for securing satisfactory roentgenographic views of the mandible in rest position and for completion of the procedure.

Centric Occlusion And Related Factors

Correct centric occlusion is one of the most important factors in the successful construction of dentures. For correct centric occlusion, correct occlusal vertical dimension is absolutely necessary.

Theory Illustrated—The following measurements are to be noted:

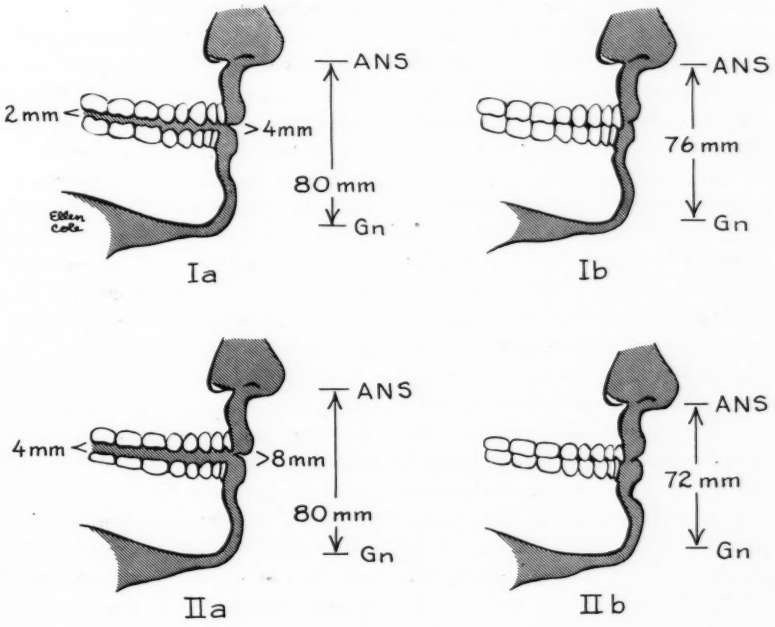
1. In Figure 1a is shown a patient's mouth in the rest position with a free-way space of 2 millimeters in the posterior, and 4 millimeters in the anterior part of the mouth. The rest position from ANS to GN is 80 millimeters. This patient has an excellent occlusion.

2. In Figure 1b is shown the centric occlusion of the same patient. The distance in centric from ANS to Gn is 76 millimeters.

3. If this patient should, after several years, develop attrition on the occlusal and incisal of all his teeth, diagnosis and treatment of his case would be determined on the measurements shown in Figures 2a and 2b.

Cause Should be Removed—If possible the *cause* of attrition should be removed. Whenever the cause is known and removed, the maintenance of the treatment is excellent. Treatment indicates increasing the vertical height to obtain correct centric comparable to that shown in Figure 1b.

Centric Occlusion Determined—In Figure 2a, as a result of attrition, the rest position from ANS to Gn is 80 millimeters. The interocclusal clearance is 4 millimeters in the posterior part of the mouth and 8 millimeters in the anterior part of the mouth. In Figure 2b there is a closed position. This position cannot be called centric occlusion because of the loss of occlusal vertical. Figure 2b is therefore designated as the oc-



1A. *The patient in rest position. Note the presence of interocclusal clearance.*

1B. *Centric occlusion of the same patient.*

2A. *The patient's rest position seven years later. Note increased interocclusal clearance from attrition without accompanying eruption of the teeth.*

2B. *Occlusal vertical of the same patient seven years later. Note wrinkles and collapsed outline of the face as a result of loss of occlusal vertical.*

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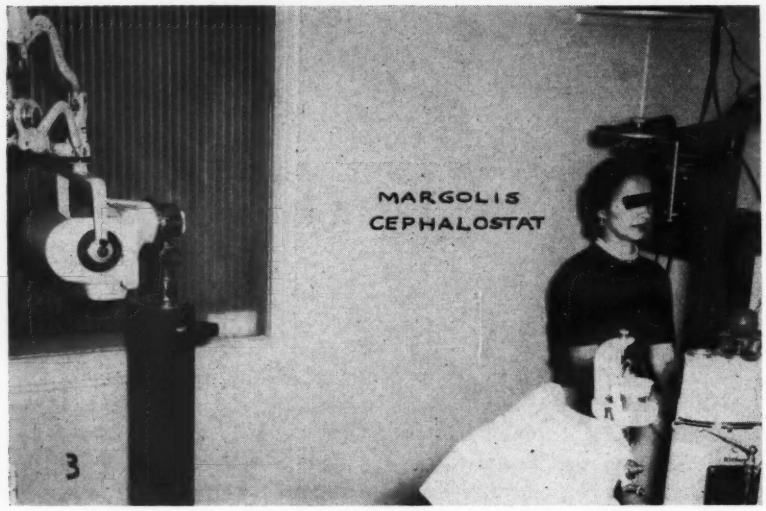


3.
Shows a patient seated before a Margolis cephlostat.

clusal position which measures 72 millimeters from ANS to Gn.

Source of Investigations

Until recently, study on this subject was conducted on dried skulls without muscle attachments. These were followed by studies made with the Broadbent-Bolten Cephalometer.

Value of Original Research—The investigations of Brodie, Broadbent, and Thompson were of enormous value to the dental profession. It was made clear that the patient's occlusion is not in itself reliable from the standpoint of diagnosis due to the fact that the occlusal vertical was solely dependent upon the neuromuscular tone.

Static Investigations — Although these studies were of material aid in diagnosis, they were static investigations for a system now called the stomatognathic system.

Stomatognathic System Studied—Jankelson[1] and his associates of the University of Washington, realizing that the stomatognathic system is a dynamic system, decided to obtain knowledge of this system through cinefluorography. To augment cinefluorography an oscillograph recording machine was also employed by these investigators. It was learned that the teeth do not come in contact during mastication. This point was affirmed by others using cinefluorography. This is one of the reasons for which, when there is an increase of the occlusal vertical height, the clicking of teeth occurs.

Teeth Occlude During Deglutition—The act of deglutition is for the purpose of ventilating the middle ear. According to Jankelson and his coworkers, not only do the muscles of mastication play a part in the act of mastication, but the cervical muscles, the tongue, the hand, and the subject's posture, are included in the dynamics of the stomatognathic system.

Technique

The following technique is designed to secure the vertical dimension at rest making it possible to obtain centric position.

1. Obtain the patient's general history with special references to metabolic diseases and blood dyscrasias.

2. Examine the oral tissues and correct abnormalities which may be present, such as extreme hypertropies or growths.

3. (a) Introral x-rays of all edentulous areas are taken to make certain that roots and impacted teeth are not present .

(b) In the posterior regions undercuts, if present, are generally in the maxilla. If these are present bilaterally remove them on one side, at least, through surgery.

(c) In the posterior region on the ridges between the maxilla and the mandible the tissues in many mouths are in contact, or the space is so small that there is no room for denture material. The correct procedure in this situation is to resort to surgery on the ridge of the maxilla or if surgery would be too radical to perform on the maxilla alone, on the ridges of both the maxilla and mandible. The purpose of this surgery is to provide the clearance necessary for the denture material. Increasing the vertical height is incorrect.

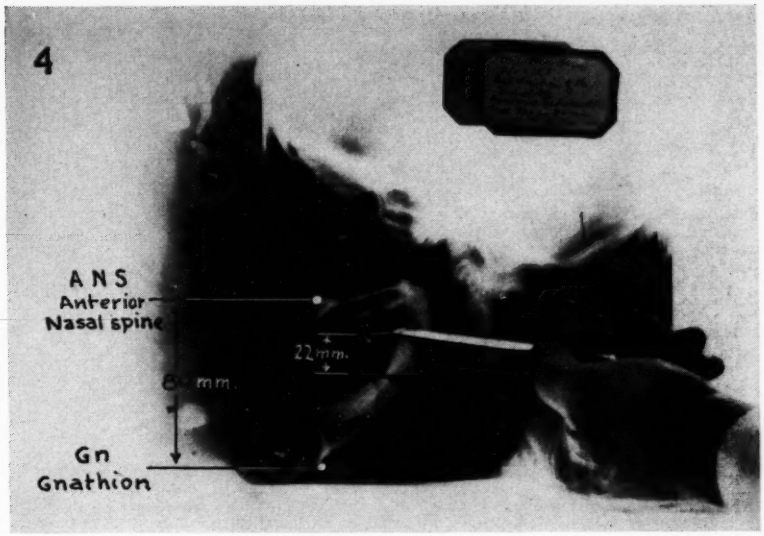
4. Use the impression material of choice.

5. Make satisfactory models and on these models construct well fitting cold acrylic baseplates *without* wax rims.

6. On the side that is to be x-rayed, bury a stainless steel pin in the baseplate (25 gauge) about the region of the first molar. Have the pin extend above the baseplate and stabilize with an acrylic cement. The baseplate should be placed on the model with the pin in position for the purpose of having the pin touch the model. Arrange to have the pins opposite each other.

7. Place the baseplates in the mouth. Under no circumstances should the baseplates be so tight that they compress the tissues. Compressing the tissues will give an incorrect reading on the articulator, regardless of the technique employed.

[1]Jankelson, Bernard; Hoffman, George M.; and Hendron, J. A., Jr.: The Physiology of the Stomatognathic System, JADA **46**:375-386 (April) 1953.



4.
Three x-ray views shown as one; x-rays superimposed upon each other.

Roentgenographic View Of Mandible In Rest Position

1. The patient should sit in an upright position without a headrest, the sagittal portion of the patient parallel to the x-ray film and the head in a comfortable position. The cassette should be on the side where the pins are. A Margolis cephalostat may be used but this is not necessary (Fig. 3).

2. The image of the x-ray film varies in size, not only according to the distance between the target and the x-ray tube, but also as to the vertical height of the patient.

3. The distortion of a long skull (vertical height) varies less than an extremely short skull (vertical height).

4. To avoid computation for each roentgenogram, and to allow for the discrepancy in distance, standardize the distance between the x-ray tube and the target.

5. The standard distance that is employed in cephalometrics is five and one-half feet. If office space does not permit this distance, standardize the distance to suit the size of the room.

Roentgenographic View — Before taking the roentgenogram assure the patient that the procedure will not be difficult. Have the patient say the letter M or L slowly, or swallow. Do not tire the patient; take the picture as soon as possible. Fatigue or strain will give an incorrect reading. If the patient is told nothing but assumes the rest position natural to everybody at frequent intervals, the x-ray view will be successful. Take three roentgenograms at intervals of an hour or more. When these three roentgenograms are in proper position, the pins will be superimposed on each other (Fig 4).

Additional Views of Value—Only three pictures are needed to ensure that the rest position of the mandible has been obtained, but as many as a dozen or more may be taken at different intervals to confirm the previous views.

Procedure—1. With a pair of dividers measure the distance between the pins on the roentgenograms. Assume that the distance between the two pins is 22 millimeters for this patient (Fig. 4).

2. It is also necessary to measure the height of the skull to arrive at the actual measurements in the mouth.

3. The two points (Fig. 4) ANS and Gn may be used. The distance in this case between the ANS and Gn is 80 millimeters. The distortion will be only 3 millimeters.

4. The actual distance between the pins is now 19 millimeters in the rest position. Allow 1 millimeter for the interocclusal clearance. This will give an actual occlusal vertical of 18 millimeters.

5. Place wax rims on the baseplates.

6. As the actual occlusal distance is 18 millimeters, arrange to have the height of the upper wax rim 9 millimeters from the inside of the pin to the outside of the wax rim of the upper baseplate. Follow the same procedure on the lower baseplate.

Method to Obtain Centric Occlusion

It must be understood that correct occlusal vertical *per se* will not provide centric. However, to obtain correct centric occlusion, a correct occlusal vertical must be present.

It is for this reason that the method described for obtaining the occlusal vertical is considered an important step in obtaining centric.

The following steps are taken:

1. Place the baseplates in position, and have the patient swallow. The act of deglutition is centric occlusion. It is for this reason that this physiologic act is employed as an aid in obtaining centric.

2. When assured that the wax rims do not have any prematurities, the wax rims are lined up between each other, so that when they are removed the distance from the inside of the pin of the upper to the inside

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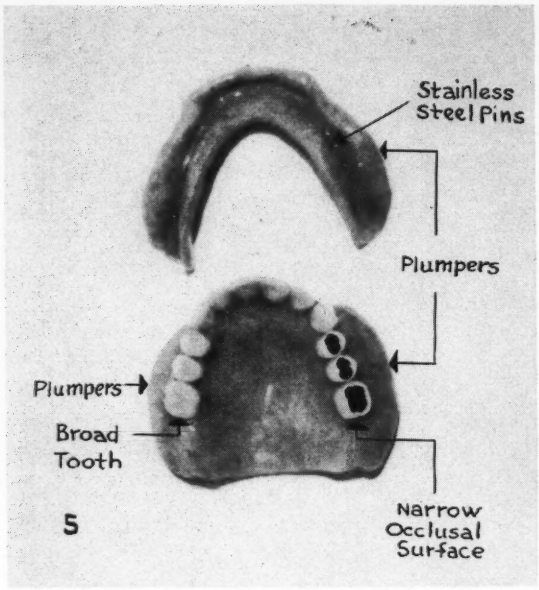


5.
Shows position of pins, plumpers, and tooth form.

of the pin on the lower, measures 18 millimeters.

3. Remove a small amount of wax uniformally (a fraction of a millimeter) on either the upper or lower baseplates. Replace the amount of wax removed from the baseplates with a plastic wax. This has the least effect on muscle tension.

4. Place the baseplate in the patient's mouth. Have the patient swallow, instructing him that when the waxes of the upper and lower baseplates are in contact he must not change the position of this relationship by moving the lower jaw in any direction. With the majority of patients, this procedure is not as difficult as it appears to be.

5. As the plastic wax which readily sears to its opponent of wax is too unreliable for mounting models, flow plaster on the wax rims to seal the upper and lower baseplates.

6. Mount the upper model employing the face-bow.

7. If the face-bow is not employed, mount the upper model parallel to the floor.

8. Place the upper baseplate on the model and lower the model on the lower baseplate to mount the lower model. The models are now mounted on the articulator in centric occlusion.

9. Remove the plaster from the baseplates.

Final Steps—1. Recheck the relationship between the patient and the articulator. When it is determined that the relationship is correct, remove the wax rims and set new wax rims in order to arrange the teeth properly.

2. It may be necessary to have the upper teeth in the posterior part of the mouth 7 millimeters long and the lower teeth 11 millimeters. The sum total of the posterior teeth, however, must measure 18 millimeters from the pin on the inside of the upper baseplate to the pin on the inside of the lower baseplate.

Esthetic Adjuncts—To the patient an attractive appearance is of greater importance than centric occlusion. As a rule esthetics and function are interrelated, and when possible the patient should be permitted both esthetic quality and good function. If possible, do not sacrifice function for esthetics.

Plumpers—Increasing the vertical height to improve esthetics is only a temporary expedient and is an incorrect procedure. Plumpers (Fig. 5) in their proper place aid materially in obtaining esthetic results. Improperly placed, the effect is unattractive.

Position of Teeth of Importance Esthetically—The greatest adjunct to plumpers is the type of teeth and the position of the teeth. The broadest tooth possible in the posterior part of the mouth will remove facial lines and improve esthetics materially (Fig. 5). Do not place the posterior teeth directly on the ridge, but a trifle outside the ridge. Function will not be lost when the teeth are not directly on the ridge but there will be less possibility of crowding the tongue. This is important in stabilization of the denture and lessens the chance of speech impairment.

Anatomic Tooth Preferred—If a broad tooth is used, this tooth must be narrowed buccolingually as much as possible at the occlusal surface (Fig. 5). As one of the functions of occlusion is the stabilization of the mandible against the maxilla during the act of deglutition, an anatomic tooth is preferred.

Teeth Tried in Mouth

When the teeth have been set up on the baseplates they may be tried in the mouth. Do not consider the esthetics at this point. Have the patient swallow. Upon completion of swallowing, the occlusion of the teeth in the mouth must coincide with the occlusion of the teeth when the baseplates are on the articulator.

Try-in Repeated—The try-in must be checked several times before the relationship is accepted. Esthetic considerations may be noted and the teeth arranged suitably.

Overjet of Anterior Teeth Required—Provide sufficient overjet of the anterior teeth so that in talking the patient's lower jaw does not appear to protrude. When this occurs the upper teeth are too far in or the lower teeth are too far out. Rearrange accordingly.

Completion of Technique

(1) Wax to periphery of model.

(2) Do not be afraid to overpostdam the upper model.

(3) Mark on the model the location of the pins. Bury a hole in the model and before final packing, place a 25-gauge stainless steel pin in the model so that in the contemplated dentures the pins will be in a similar

position to that in the baseplates.

(4) After processing, do not remove dentures from models but place the models back on the articulator to examine for changes in the occlusion which may have taken place as a result of processing.

Average Interocclusal Clearance—When the dentures are completed take at intervals three roentgenograms in the rest position and one in centric occlusion. At least one millimeter of interocclusal clearance should be present. It has been found that the average interocclusal clearance in the posterior part of the mouth is 1½ to 2 millimeters. By starting with 1 millimeter of clearance it is easy to reduce the height of the teeth. It is a difficult procedure, however, to increase the height of the teeth.

Roentgenograms an Advantage—When the outline form of the maxilla and mandible is considered, the advantage of the roentgenograms is apparent despite the fact that this is only a static procedure for a dynamic mechanism. Centric occlusion is momentarily a static relationship. The vertical height of the skeleton is virtually static during treatment.

Basis for Opinion — Precluding pathologic incident (trauma from accident, habits) the outline of the skeleton is the same from birth to death. The growth of the skeleton may be divided into three stages:

Stage 1: (a) Between birth and about ten years of age, a dramatic growth of the skeleton. (b) Between ten years and fifteen years the growth is rapid but not comparable to the growth in Stage 1 (a). (c) Between fifteen years and maturity (19 to 21 years) the growth is rapid but at a considerably lower rate of speed than in 1 (b).

Stage 2: Between maturity and the beginning of the aging process the skeleton is virtually static. The person may gain or lose weight but the skeleton remains about the same in size and outline.

Stage 3: The aging process. Diminution of the skeleton occurs not only vertically but laterally as well. Diminution is believed to begin slightly at about age 60 and to continue slowly through the years until death which at the present state of longevity may be between the years of 86 and 90.

Conclusion

This method of obtaining the mandible in the rest position and the proper free-way space within a millimeter of accuracy is a great aid in obtaining centric. As centric is dependent on occlusal vertical, with this technique it is possible to give the patient the height of the tooth he needs, rather than that estimated by the dentist. As a result there is a physiologic change in the tissues, rather than (1) a pathologic change caused by an increased vertical, or (2) impairment caused by a reduced occlusal vertical. Adjustments and time spent on dentures after they are completed will be reduced to a minimum. Correct centric occlusion ensures a correct centric relation. It is also demonstrated that a correct occlusal vertical is a part of centric occlusion.

435 *East Front Street*

An Evaluation of the Problem of Galvanic Currents in the Oral Cavity

RALPH W. PHILLIPS, M.S., Indianapolis, Indiana

Summary

The presence of small galvanic currents due to similar or dissimilar metals has been well established by laboratory and clinical investigations. The magnitude of these currents is influenced by many variables, and the actual pain induced from galvanic shock is infrequent in the average dental practice. The cement base does not insulate the pulp from this current, and if metallic restorations are used the only satisfactory method of eliminating postoperative pain due to galvanic currents is the placement of an extra-oral varnish on the surface of the restoration.

General Subsidence of Pain—There is now evidence to indicate that the pain generally subsides rapidly, within a few days, because of the healing of the cut tooth and thus reduction in the sensitivity. The currents, however, remain fairly well stabilized indefinitely.

No Evidence of Harmful Effects—The role which these currents play in pathologic changes in oral, or other, tissues probably has been exaggerated. Although there is not adequate evidence to indicate that certain deleterious effects might not be induced by these currents, it must be remembered that there is also absolutely no evidence showing a correlation between oral and systemic dyscrasia and these currents.

Action Controversial—The problem will remain controversial as long as there are dissimilar metals used in the mouth, but the efforts which would be necessary to resolve this issue would not seem to be worthy of the time and energy required.

Correlation Unsubstantiated—It is the unqualified opinion of American research workers in pathology and dental materials that these currents do exist but that probably they are deleterious only from the standpoint of possible discomfort to the occasional patient. Until it can be substantiated clearly that there is a correlation between these currents and the many dyscrasia to which they are attributed, it seems logical to assume that such undiagnosed instances are related to more logical, fundamental, and established factors.

Adapted from *Journal of the Indiana State Dental Association* **37**:11 (January) 1958.

Portable STEAM STERILIZER

HARRY K. IHRIG, B.S., M.S., Ph.D.,*
Milwaukee, Wisconsin

DIGEST

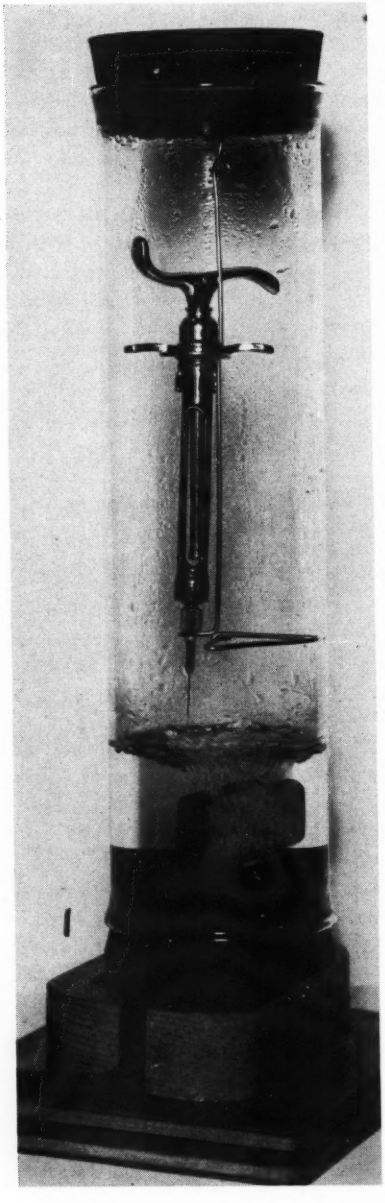
A portable sterilizer for use in the home or in mobile units and field stations in the armed forces or public health services is often extremely useful. Boiling syringes or other dental instruments in local water makes it necessary to dismantle them to prevent sticking from the dissolved salts in the water. In the reassembly there is risk of contamination. A convenient portable sterilizer has been described previously.[1] A similar sterilizer adapted for dental use is described in this article.

Description

A glass tube and two rubber stoppers with stainless steel electrodes are the essential parts of the sterilizer. Figure I shows the sterilizer in use with a dental syringe suspended in the steam.

Mechanical Parts—The pyrex glass tube is 2 and ¾ inches inside diameter, and 11 inches long. The lower rubber stopper has two stainless steel electrodes mounted in it by means of prongs which go through the stopper and become the electrical connection with an ordinary outlet. The electrodes are ¼ inch high and ¼ inch apart. The outlet is enclosed in a wooden base to provide stability.

Manner of Use—The upper stopper has a stainless steel wire harness which is used to hold the syringe suspended in the steam. A hinge is formed in the wire which allows the stopper to be removed and the syringe raised for easy removal as shown in Figure 2. Other harnesses could be fabricated to hold other instruments. A hole is drilled in the upper stopper to allow steam to escape.



1.
The sterilizer in operation.

Method of Operation

To start the sterilizer, about half an inch of water is introduced to cover the electrodes. The water may be put in through the hole in the top stopper or by removing the stopper.

Successive Steps in Operation—1. The assembled syringe is mounted in the harness with the needle supported by the loop as shown in Figure 1.

2. The base receptacle is plugged into a convenient electrical outlet.

3. Steam bubbles form on the electrodes in a few seconds. This is the result of the heat generated by the resistance of the water to the passage of current between the electrodes.

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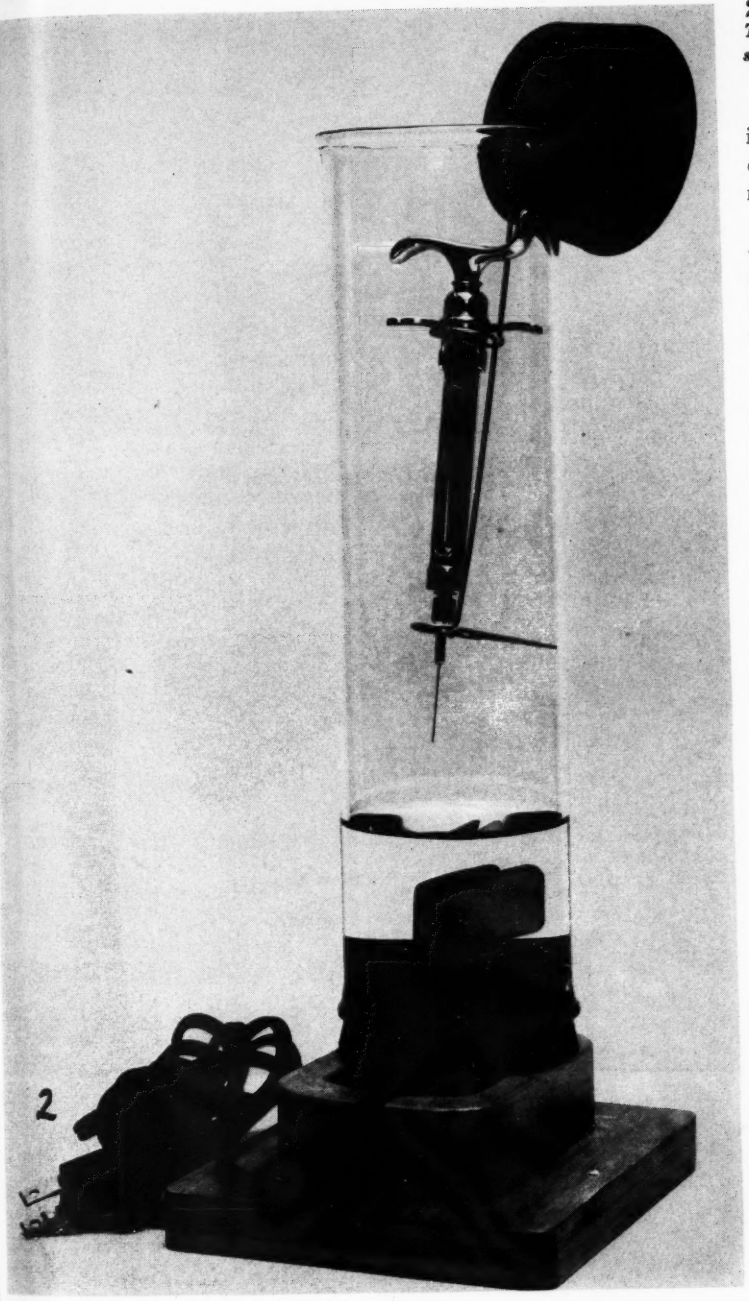
*Research Professor of Biophysics, Marquette University Graduate School and Vice President in Charge of Research, Allis-Chalmers Manufacturing Company, Milwaukee, Wisconsin.

[1]Ihrig, H. K., U. S. Patent No. 2,805,454, September 10, 1957.
Ihrig, H. K.: Syringe Sterilizer, JAMA 166:960-907 (Feb. 22) 1957.



2.
The syringe ready for removal after sterilization.

4. In less than a minute the water is boiling, and steam is generated to envelop the syringe in a sterilizing medium.

5. The speed of boiling will depend on the amount of conducting salts in the water. The "harder" the water, the greater the speed of boiling. Even with distilled water, however, the boiling starts within a couple of minutes.

Time Required for Sterilization— To determine the time required to reach 212° Fahrenheit a thermometer was inserted through the upper stopper near the top of the syringe. With ordinary tap water 7½ minutes were required to reach boiling temperature. With distilled water about twenty-five minutes were required. Hard waters containing large quantities of dissolved salts may boil very rapidly but this may be regulated by diluting these waters with distilled water.

Sterilization Assured — Sufficient time should be allowed to assure sterilization. About twenty minutes is allowed with tap water.

Automatic Shut-Off—If the water boils dry when the sterilizer is forgotten, the current is automatically shut off since there is no water between the electrodes to conduct it.

Summary

A compact, portable and inexpensive sterilizer has been designed to be used for syringes and other dental instruments. These are suspended in live steam and can be used in less than half an hour after the sterilizer is plugged in.

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Tray Preparation for Functional Trim of the COMPLETE LOWER IMPRESSION

WILSON W. CHASE, D.D.S., and ROBERT G. VIG, D.D.S.,*
Los Angeles

DIGEST

This article presents a procedure for preparing the lingual flange of the lower tray with which to make impressions for complete lower dentures which are stable, retentive, and comfortable.

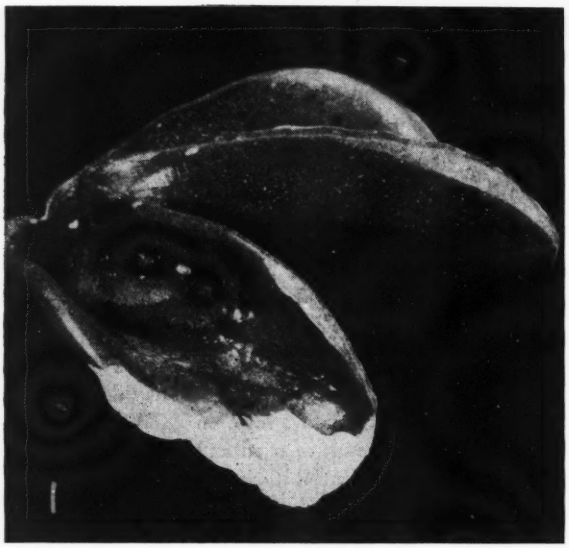
Procedure for Accurate Functional Impression

Impression tray borders should be just short of the tissues in function to support properly the impression material. When adjusting the peripheries of individual trays for complete denture impressions, the labial and buccal borders can be seen and marked for trimming. However, the lingual and distal borders of the mandibular tray cannot be visualized while the masseter muscles, the tongue, and the tissues of the floor of the mouth are in function. Use of the method described here will prepare these unseen tray borders for taking an accurate functional impression.

Detection of Interference—By using a denture sore spot detector cream** unaltered as supplied by the manufacturer, it is possible to detect quickly the exact spots where the tray periphery interferes with the functioning tissues and therefore needs trimming in length or width or both.

*From the Dental Service, Veterans Administration Center and the School of Dentistry, University of Southern California.

**Denture Sortec—Kerr.



1.
Muscle function wipes cream off tray periphery in masseter area.

Advantages of Denture Cream—The cream possesses the following qualities useful for this purpose:

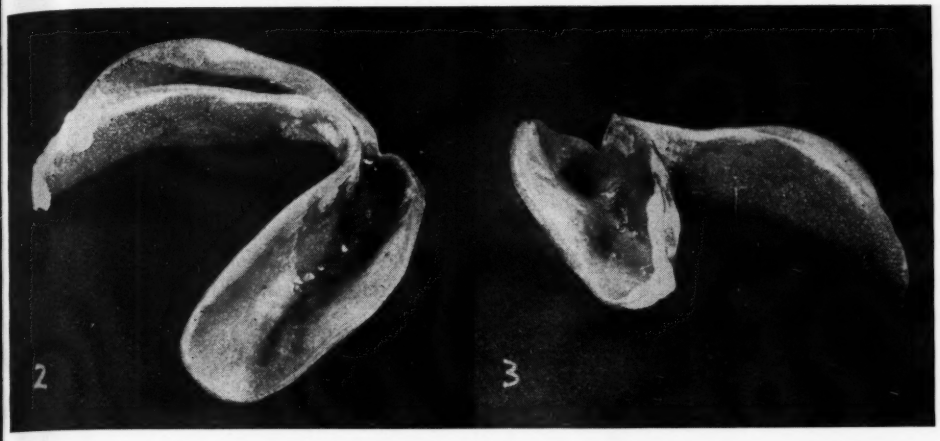
1. It is easily displaced by tissue in function.
2. It clings to a dry tray, yet is easily removed by disposable tissue.
3. It does not stick to mucous membrane.
4. It is opaque.

Tray Trimmed in Sections—Experience in preparing many hundreds of trays has shown that it is advisable to trim in four sections on each side according to the influence of the following structures:

1. The masseter muscle and the pterygomandibular raphe
2. The retromylohyoid curtain
3. The mylohyoid muscle
4. The lingual frenum and lingual sulcus

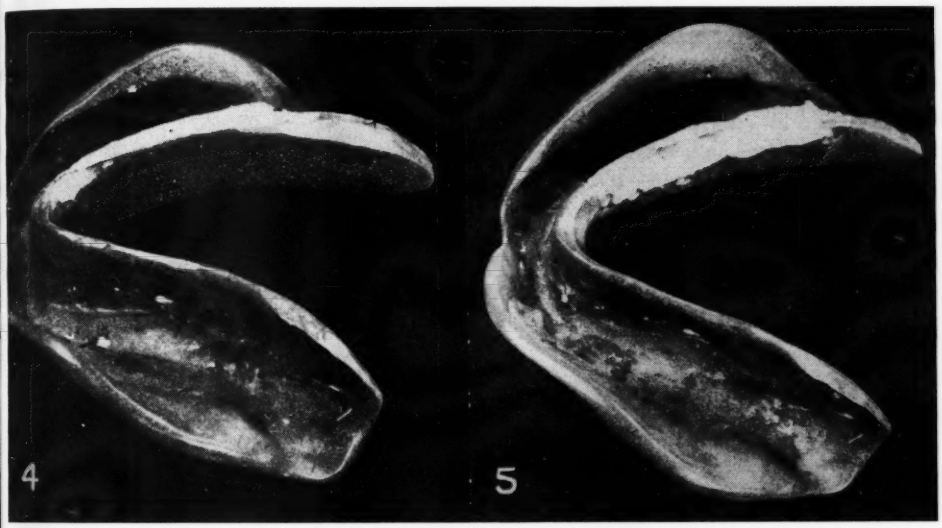
The Technique

1. Cream is piled on the edge of the tray in the area to be tested (Figs. 2 and 4).
2. The tray is seated and the functional movements of swallowing and maneuvering the tongue are made by the patient while the operator holds the tray in place with the forefingers.
3. If the functioning tissues wipe off enough paste to expose the tray, impingement by an overly long tray flange is demonstrated (Figs. 1, 3, 5, and 6).
4. *Only* the exposed spot on the tray is trimmed with a Number 2 flame-shaped denture bur.
5. The cream is removed with disposable tissue and new cream is placed on the edge of the flange.
6. This procedure is repeated until the functioning tissue does not expose the tray through the cream. The next area can be tested and trimmed in a similar manner.



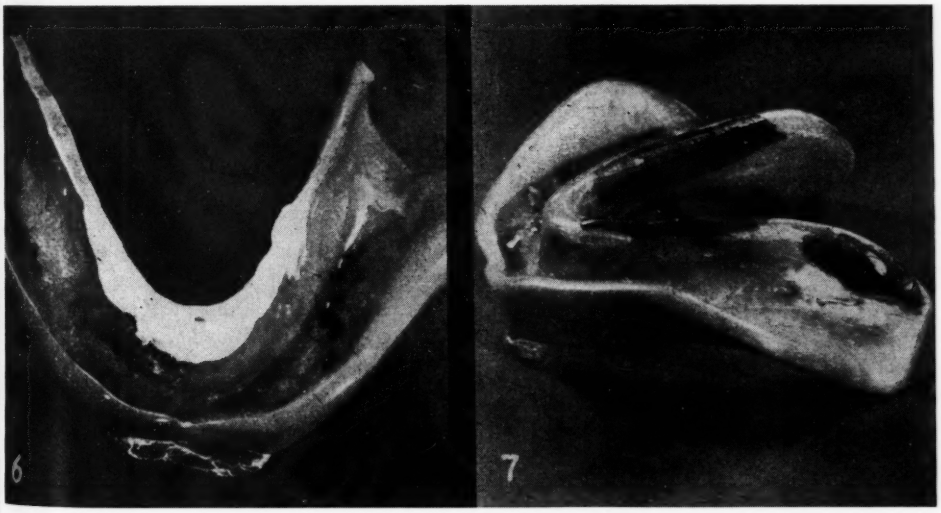
2.
Detector cream piled on periphery in retromylohyoid area.

3.
Functioning retromylohyoid curtain wipes cream off periphery in retromylohyoid area.



4.
Detector cream piled on periphery in mylohyoid area.

5.
Cream wiped off periphery in mylohyoid area indicates overextensions to trim.



6.
With a bur, trim only the spot denuded of cream.

7.
Rebuild the retromylohyoid area and correct short borders with impression plastic.

Step 1—Using the technique described, simultaneously test the distal edge influenced by the pterygomandibular raphe and the distobuccal edge influenced by the masseter muscle. Have the patient open as wide as possible, then close against the downward pressure of the operator's fingers on the tray.

Step 2—Test the retromylohyoid curtain area by having the patient protrude the tongue as far as possible. Reduce the flange in length and/or thickness as indicated by the displaced cream. Then place new cream

and have the patient swallow. Cut away overextensions in both dimensions as the cream indicates (Figs. 2 and 3).

Step 3—Test the mylohyoid area with three maneuvers, one at a time.

(1) Have the patient place the tip of the tongue in the opposite cheek as though removing food from the buccal pouch.

(2) Have the patient swallow.

(3) Have the patient say "walk" *loudly* three times.

Mylohyoid action will probably remove cream from the inside or tissue surface of the flange. Relieving the tray flange here tends to increase a desirable horizontal extension of the border in this area (Figs. 4 and 5).

Step 4—Test the lingual frenum and sulcus area from one second bicuspid to the other by the one maneuver of having the patient place the tip of the tongue in the maxillary labial vestibule and move it from cuspid-to-cuspid area (Fig. 6).

Step 5—The retromylohyoid undercut area usually has to be blocked out to construct the tray. This portion of the tray should be rebuilt into the undercut area with impression plastic. Place it on the tissue side of the flange and have the patient mold it by protruding the tongue and swallowing.

Knife trim the impression plastic flush with the trimmed tray edge, remove that feathered up over the retromolar pad, and lightly scrape the tissue surface so that it will not impale the soft tissue against bone (Fig. 7). This treatment will ensure that the finished denture flange will turn in toward the mandible in this area and the patient will not feel the edge with the tongue.

Step 6—If any areas are trimmed too short, correct the deficiency with impression plastic (Fig. 7).

Step 7—Lightly holding the tray in place, have the patient repeat all the tongue maneuvers. The tongue should not lift or move the tray. If it does, repeat the testing with cream and trim where indicated until it does not.

Tray Ready for Impression Material—Impression material may be trimmed with the same movements repeated in rapid succession while the operator holds the tray with the forefingers with just enough force to resist movement caused by the "push" of the functioning tissues against the impression material. The finished denture will present various degrees of an ogee curve of the lingual flange, and it will be stable and retentive.

Veterans Administration Center
Wilshire and *Sawtelle Boulevards*

*Radiation Hazards Resulting from the Use of Dental X-ray Machines**

Reduction of Hazards

The hazards to the patient can be greatly reduced by simple modifications to either the machines or the techniques which are generally in use, as follows:

1. Pure sheet aluminum should be between the x-ray beam source and the patient. The added aluminum should be sufficient to make the total filtration equivalent to about 2 millimeters of aluminum. The amount added varies with each type of machine, each having some inherent filtration which can be ascertained from the manufacturer. Adequate added filtration will, on the average, reduce the skin (and marrow) dose by about 50 per cent.

2. A lead diaphragm should be placed between the beam source and the patient to ensure that the area of the skin surface radiated at each exposure is not more than 2¾ inches in diameter. Depending on the area of skin exposed by the machine without a diaphragm (this varies from about 4½ inches to 3½ inches) the skin or marrow dose can be reduced by an additional 38 to 68 per cent by this means.

3. A technique should be employed which will make use of the fastest film now procurable. Depending on the film employed at present, this can reduce the patient exposure by another 66 per cent or more.

Diagnostic Value Maintained—If each of these safety measures is adopted the amount of exposure of patients to radiation from the dental x-ray machine can be reduced by as much as 95 per cent without reducing the diagnostic value of the films.

Additional Reduction in Facial Dose—In addition to this, if one of the newer dental x-ray units operating at 90 kilovolts (rather than 65 K.V.) is employed, an additional reduction of about 28 per cent in facial radiation dose can be achieved.

From *Journal of the Canadian Dental Association* **24**:411 (July) 1958.

*A Statement prepared by *The Research Committee, Canadian Dental Association.*

CAPILLARY HEMANGIONA
of the Gingiva: Case Report

LOUIS CHARLES ESKIN, B.S., D.D.S., M.S.D., Philadelphia

DIGEST

In a review of the publications on the subject, numerous descriptions were noted of hemangioma of the cheeks, tongue, or lips, with a few cases involving the gingiva. Primary hemangioma of the gingiva, it would appear, as an entity, is rare. This article presents a definitive explanation of this phenomenon, stresses the importance of differential diagnosis, and suggests a method of treatment as exemplified in a case history of such a lesion encountered in dental practice.

Definition

The term capillary hemangioma is applied to a tumor composed of newly formed blood vessels which take the shape of capillaries. The neoplasm may be present at birth or it may appear later in life. The growth has occurred in various parts of the body and not too uncommonly about the oral cavity.

Clinical Characteristics—(1) The capillary hemangioma may appear as a soft, rather flat, or elevated poorly circumscribed mass.

(2) It is easily compressible and blanches, varying in color from deep red to purple.

(3) Unless the neoplasm grows to a considerable size, it is usually asymptomatic, except that it bleeds freely upon the slightest provocation.

(4) In its early stages, the growth may resemble an acute inflammatory process. With enlargement, it may show clinical characteristics similar to (a) granulation tissue, (b) hyperplasia, (c) hypertrophic gingivitis, (d) fibroma, (a) lipoma, or (f) giant cell tumor.

(5) The sizable hemangioma is easier to recognize by its color and characteristic pulsation.

Diagnostic Symptoms—The fact that the blood can be forced out of the mass upon pressure and immediately return with the release of pressure is almost a diagnostic symptom.

Early Diagnosis Important—It is important to make an early diagnosis of the capillary hemangioma because of the possibility of hemorrhage and of spreading indefinitely, converting a large area of tissue into a swollen, discolored mass of thinly covered blood vessels. Besides becoming a source of copious hemorrhage due to injury or simple rupture of the thin walled vessels there is the possibility of infection and suppuration.

Invasion May Occur—While the hemangioma is considered a benign growth, it may invade the underlying bone to cause osteolysis. Thoma[1] has stated, "These tumors grow by infiltration of the surrounding tissue and not only exhibit local distinctive properties but are also apt to metastasize when existing for a long time or when irritated constantly."

Differential Diagnosis

Capillary hemangioma of the gingiva must be differentiated from hematoma, hyperplasia, hypertrophic gingivitis, fibroma, and epulis.

A Hematoma—May appear as a tumor-like mass because of the entry of blood into the tissues. It is more circumscribed and will not bleed freely upon touch or compression. There is usually a history of trauma.

Hyperplasia—Abnormal proliferation and growth of tissue sometimes resembling a tumor. Hyperplasia is usually the result of chronic irritation, such as the prolonged use of an ill-fitting denture.

Hypertrophic Gingivitis—This is an inflammatory mass of gingiva confined to the gingival papillae and margins of the teeth. It is an inflammatory reaction and not a neoplasm.

The Fibroma—This is of connective tissue origin and is a well-defined circumscribed neoplasm. The soft type fibroma with its reddish-blue appearance may resemble a hemangioma. Its boundaries are usually fixed and, except the angiofibroma, will not bleed freely except when traumatized.

Author's Note: Appreciation is expressed for the assistance of Claude P. Brown, M.D., clinical pathologist, and David R. Morgan, M.D., pathologist at the St. Luke's and Children's Medical Center.

[1]Thoma, Kurt H.: Oral Pathology, ed. 2, St. Louis, Tht C. V. Mosby Company, 1948, pp. 1075-78.

The Common Epulis—This is a localized inflammatory hyperplasia and is not classified as a neoplasm. It is generally located on the alveolar mucosa at the site of a recent tooth extraction, retained bone spicule, or may extend from the papilla between two teeth.

The variety in differentiation makes it important to obtain a complete history before making a provisional diagnosis.

Histopathology

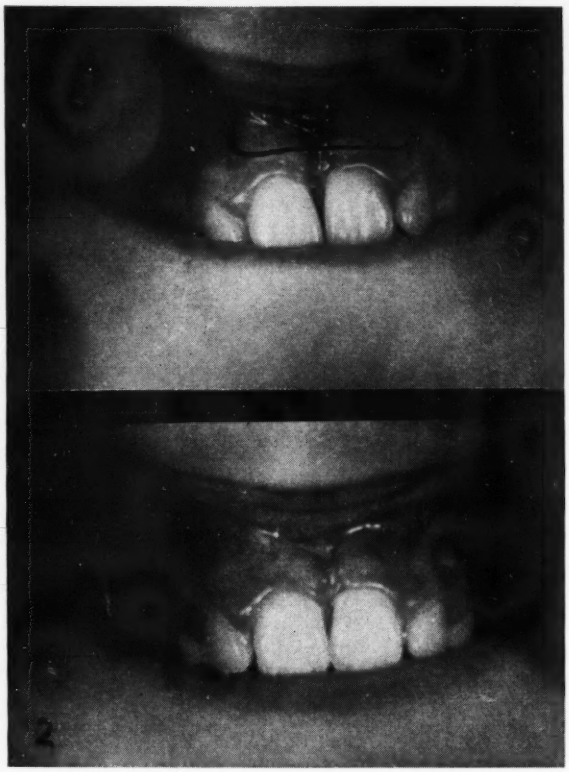
In discussing the pathogenesis of these tumors, Thoma[1] stated "The hemangioma is formed from endothelial rudiments or from the endothelium of blood vessels. New vessels form in the shape of capillaries or cavernous spaces."

Origin and Growth—Ewing[2] quoted Rippert who in 1898 analyzed in detail the origin and growth of simple angioma. By means of interstitial injection he found that "the vessels had few or no lateral anastomoses, while the injection mass passed freely into the afferent artery and efferent veins, but not into the tissues surrounding the tumor. The result indicated that the tumor process resided in an isolated segment of the vessel walls, producing elongation and varicosities in a more or less closed territory without gradual involvment of surrounding vessels. Where the tumor forms a new lobule or invades fat or other tissues, it is not by extension of the tumor process to the healthy vessels of the new area but by the projection of new vessels which grow from the tumor, while the vessels of the invaded part are compressed or occluded." The new mass of vessels apparently have no connection with the normal vessels of the invaded tissue.

Composition—The endothelial cells of the hemangioma tend to form blood vessels, which make up the main part of the tumor, while the stroma is scant and composed of connective tissue.

Effect of Injury: Where a tumor is subjected to frequent injury and infection, inflammatory infiltration in the stroma may be observed.

Random Arrangement: The blood spaces may be of capillary type (capillary hemangioma) or large, irregular cavities (cavernous hemangioma) lined with endothelial cells and separated by thin, nonvascular connective tissue. According to Bernier[3] "the vessels have a purposeless arrangement and doubtful connection with the vascularity of the part."



1. *Hemangioma of the gingiva, preoperative view.*

2. *Capillary hemangioma of the gingiva, postoperative view.*

Case Report

The patient in this case was a girl ten years of age. Her past history revealed only the usual childhood diseases. There was no familial history of any growth similar to the one present.

History—One month prior to referral the patient noticed a small swelling immediately above the gingival margins of the two upper central incisor teeth. Upon the lightest touch it bled freely. When her mother applied hydrogen peroxide, the bleeding subsided somewhat. Several dentists had suggested treatment for gingivitis. A mouthwash prescribed had not been effective.

Clinical Examination—The patient, a normally developed, well-nourished, premenstrual girl, ten years of age in apparent good health, exhibited a deep red grapelike mass on the gingival mucosa about one millimeter above the cervix of the upper two central incisors and approximately two centimeters in diameter.

Outline Indefinite: The neoplasm was without definite outline since it appeared to have been traumatized and bled freely during inspection.

Surrounding Area Inflamed: The mucosa surrounding the mass was slightly inflamed in an area of about one millimeter.

No Pain Present: The mass was soft and slightly tender to palpation but otherwise was not painful (Figs. 1, and 2).

Radiographic Examination — No bone disease was revealed. The provisional diagnosis was hemangioma or angiofibroma of the gingiva.

---

[2]Ewing, James: Neoplastic Diseases, ed. 4, Philadelphia and London, W. B. Saunders Company. 1940. pp. 249-53.

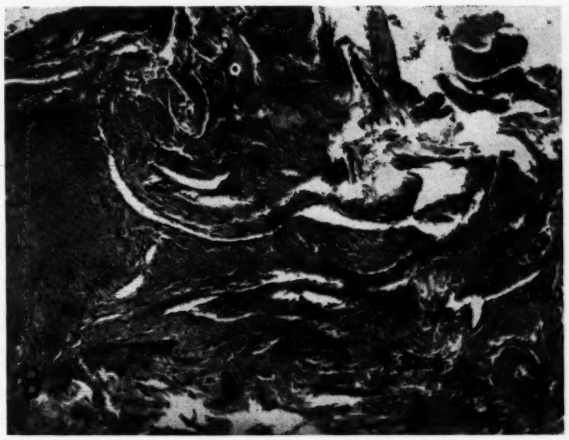
[3]Bernier, Joseph L.: A Manual for the Differential Diagnosis of Oral Lesions, St. Louis, The C. V. Mosby Company, 1942, pp. 132-34.

Treatment

Under block anesthesia, the lesion was excised and cauterized to avoid excessive bleeding. The mass was sent to the pathologist for microscopic study.

Microscopic Report

"On the surface is the squamous cell mucosa of the mouth and beneath this is a stroma of firm, dense fibrous tissue. In this stroma and separated from each other are rounded areas, and also elongated ones, of endothelial cells which form capillaries. However, when the growth was removed the blood escaped and most of the capillaries collapsed but some remain. Not all of them contain blood but a number do. This is an interesting little growth. Diagnosis: capillary hemangioma of the gums. Benign." (Fig. 3).



3.
Capillary hemangioma of the gingiva.

Discussion and Comments

The determination of the scope of neoplastic processes affecting blood vessels present unusual difficulties. Considering the physiology of blood vessels and their presence everywhere in the body, differentiating them from other tissues or organs has caused much difference of opinion in the distinction of the hemangioma from other neoplasms.

Neoplastic Properties of Blood Vessels—As expressed by Ewing[2], "Vessels occupy an altruistic position in the physiology of organs, subordinating themselves to more specialized structures. Possessing less natural autonomy, they may be expected to display pronounced neoplastic properties. Thus blood vessels in a tissue or organ vary extremely in both normal and pathological conditions."

Organoid in Character—"Not being composed of a simple tissue, tumors of vessels must be organoid in character. The growth of vessels is markedly influenced by the element of mechanical pressure of the circulation, which is absent in other tumors."

Nutrition Provided—"Finally, the nutrition of vessels, especially of those subject to tumor growth, is provided in a different manner from that existing in other tissues."

Theory of Origin and Development—Various theories have been expounded as to the origin and development of the hemangioma. Herbut[4] discussed a hormonal cause and in support of this theory pointed out that the onset of menses or the beginning of pregnancy sometimes ushers in a rapid increase of the lesion.

Recognition May be Difficult—Authorities appear to differ in opinion as to what constitutes a hemangioma, its terminology or classification. Anderson[5] commented, "because of the variety and complicated structure of many vascular tumors, an excessive number of terms has been used in the designation of any given tumor."

Classification of Types—In an attempt to simplify recognition, Stout[6] classified the vascular tumors into eight types with numerous subdivisions. Figi[7] classified the hemangiomas encountered in or about the oral cavity as "the capillary, cavernous, and racemose. The capillary type is not seen so frequently as the others except in cases in which a 'port wine' nevus extends from the face into the lip or the adjacent oral mucosa."

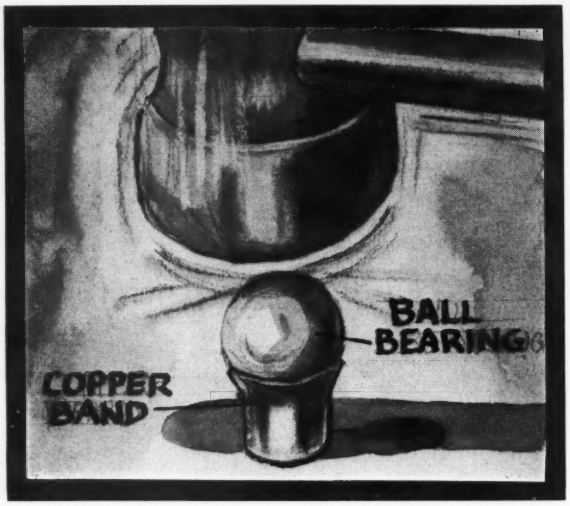
Two Main Types—Thoma[1], in discussing the histopathology of hemangioma, mentioned the capillary and the cavernous as the two main types.

Summary

A review of the literature on this subject revealed the existence of a number of capillary hemangiomas which originated in other parts of the oral mucosa. It was apparent that hemangioma of the gingiva as an initial site is infrequent. The clinical findings, differential diagnosis, and histopathology of the tumor were discussed. The importance of a correct diagnosis and the reasons for early removal of the growth were emphasized. The recurrence of this tumor is unlikely if complete surgical excision is carried out well beyond the borders of the mass. In the case here reported there has been no recurrence after a period of three years.

2119 *Spruce Street*

[4]Herbut, Peter A.: Surgical Pathology, Philadelphia, Lea and Febiger, 1948, pp. 16-17.
[5]Anderson, A. D.: Pathology. St. Louis, The C. V. Mosby Company, 1948. p. 603.
[6]Stout, A. P.: Tumors of Blood Vessels, Texas J. Med. **40**:362-365 (Nov.) 1944.
[7]Figi, F. A.: Hemangiomas of the Mouth, Arch. Otolaryn. **46**:565 (Oct.) 1947.



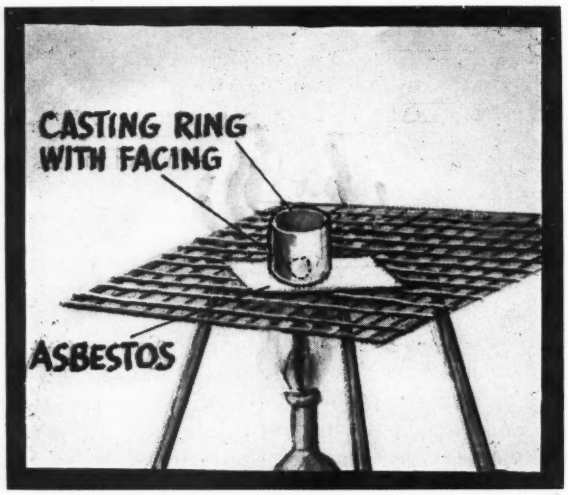
1

Clinical and Laborator

Flaring a Copper Band

J. T. Martuch, D.D.S., Cleveland, Ohio

1. Place the band on a hard surface. Set a steel ball bearing on top of the band. A few taps with a hammer will flare the band. A flared band is easier to place on the tooth and easier to remove.

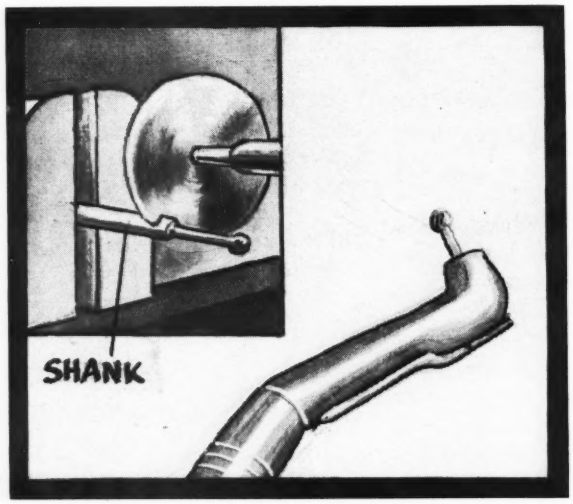


2

Glazing a Facing with a Blowtorch

G. D. Van Blaricum, D.D.S., Minneola, Kansas

2. Apply stain or glaze to the facing. Place the facing on an asbestos strip on the grid. Surround the facing with a casting ring to prevent the flame of the torch from coming in direct contact with the facing. Heat until the glaze or stain begins to flow. Remove the ring and slide the asbestos strip to a cool place on the grid.



3

Shortening an Airotor® Bur

J. T. Clynes, D.D.S., New Orleans, Louisiana

3. To reduce the length of an Airotor chuck-type bur cut it at the shank with a disc. The shortened bur is useful in pedodontics and in areas of difficult access.

READERS Are Urged to Collect $10.00

For every practical clinical or laboratory suggestion that is usable, DENTAL DIGEST will pay $10 on publication.

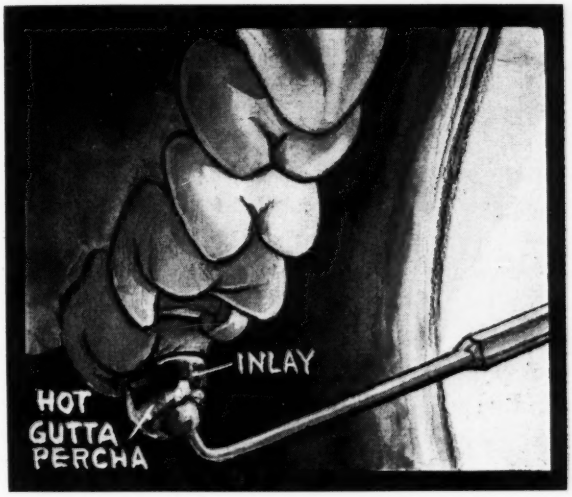
You do not have to write an article. Furnish us with rough drawings or sketches, from which we will make suitable illustrations; write a brief description of the

SUGGESTIONS . . .

An Aid to Seating Inlays

Harold G. Herr, D.D.S., Ephrata, Pennsylvania

4. When seating an inlay in the maxillary posterior region place a small piece of hot gutta percha on a burnisher. Pick up the inlay on the gutta percha and carry to position in the cavity preparation.

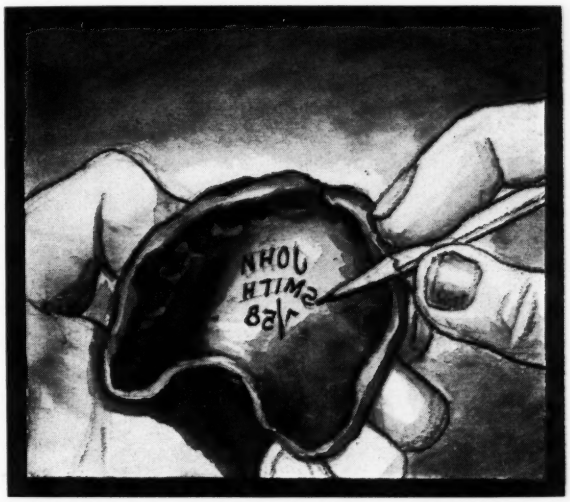


4

Model Identification

David Waldman, D.D.S., Flushing, New York

5. Use an indelible pencil to print the name of the patient in reverse in the alginate impression. When the model is poured the name will be imprinted correctly.

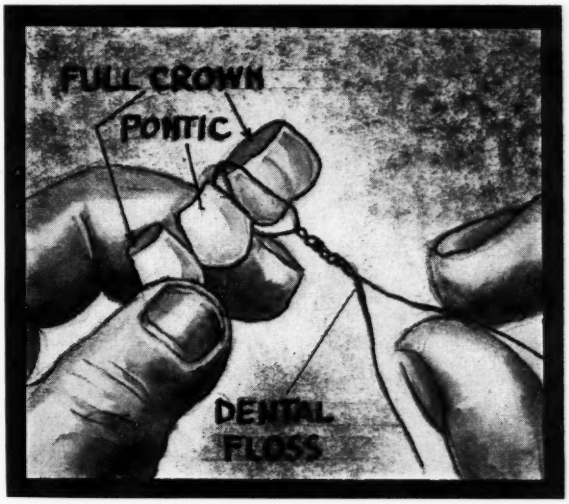


5

Removal of Excess Cement From a Bridge

John Allan Bier, D.D.S., San Francisco

6. Place a loop of dental floss through the embrasure around one of the solder joints. After the cement has set draw the floss through the embrasures and between the pontic and the ridge to remove the excess cement.



6

technique involved; and jot down the advantages of the technique. This shouldn't take ten minutes of your time. Turn to page 79 for a convenient form to use.

Send your ideas to Clinical and Laboratory Suggestions Editor, DENTAL DIGEST, 708 Church Street, Evanston, Illinois.

The EDITOR'S Page

IT SHOULD be expected that with the newer instruments that have been developed for the removal of the hard dental tissues more retentive restorations would be produced. Whether this is true or false has not been discussed at any length in the dental literature. One would anticipate that with better cutting tools (rotary, ultrasonic, water or air-driven) cavity preparations of better form would be created. Certainly with less strain on the patient and on the operator it would be expected that more accurate preparations would result. In the so-called "quadrant dentistry," where three or four teeth are prepared at one sitting, it should be possible to produce cavity preparations that were better and more favorably integrated with each other. The use of elastic impression materials and the indirect methods of waxing and making castings should likewise improve the end-results of tooth restorations.

There is the danger, however, that as our tools are improved our concepts of cavity form have not improved. There is, in fact, a real danger that in our zeal to produce faster we may neglect the geometric principles that underlie all dental engineering. Despite how magnificently machined and how precisely manufactured are our tools we can never afford to neglect the engineering principles upon which all restorative dentistry is based.

It would be for naught if we operate faster, with less discomfort to the patient and strain to ourselves, with more procedures done in the laboratory than at the chair—and as an end-product create restorations that are substandard.

Our predecessors, despite their slower and cruder tools, have made thousands of restorations that have stood the test of time. There is no substitute for craftsmanship and many older dentists were artisans of exemplary skill. It is a temptation to draw a parallel from other fields to show the decadence of the craftsman with the introduction of "machine methods." We would not wish to have this happen in the dental profession.

It would seem appropriate, therefore, to review the principles of retention that have been so well stated by Rosenstiel.[1]

"An attempt has been made to assess the retentive quality of inlay preparations as a function of their geometrical configuration.

"In so doing, other important factors determining retention, but which are physical rather than mathematical, had to be neglected. The compressibility of dentine was mentioned as well as other factors, which are the strength of the materials from which the restorations are made, the magnitude of the stresses which they are expected to undergo after insertion and also the contribution of the cementing medium to retention (Smyd, 1948). For a real advance from empirical to scientific design of preparations it would seem necessary that a practical formula be established which expressed, in quantitative terms, the degree of retention of a preparation as a function of length, angles, forces, and physical constants. Even should such a formula be found, it must be emphasized that the need for retention is only one of several factors which influence inlay design. Some of the others are the need to protect parts of the remainder of the tooth against excessive stresses (for example, by cuspal protection), the different types of marginal seal which may be used (butt joint, bevelled joint, chamfered joint or slice), esthetic requirements, particularly in crown work, and all these factors can influence the retentive value of a cavity preparation.

"Summary: Whether inlays and crowns are retentive or not depends on whether they can move into the preparation in one definite path, the 'path of insertion' or 'axis' or in other words whether their movement is restricted to one degree of freedom. Because of the presence of elastic forces and the impossibility of cutting accurately machined cavities, a minimal amount of taper (or 'draft') is necessary, but a deviation from parallelism of more than 5 degrees is liable to lower the retentive value.

"While a quantitative assessment of retentiveness would have to take into account the physical properties of tooth, restoration, and cement, it is possible to deduce the presence or absence of retention of a preparation from its geometrical configuration alone by verifying that only one insertion path exists.

"The length of the restricted portion of this path can serve as a relative measure of the retention of otherwise similar preparations."

[1]Rosenstiel, Edwin: The Retention of Inlays and Crowns as a Function of Geometrical Form, Br. D. J. **103**:388-394 (December 3) 1957.

MEDICINE and the Biologic Sciences

Allergy from Therapeutic Agents

The specialty of allergy has been complicated by the production of the many new drugs in recent years. Each drug is a potential sensitizer. Approximately 500 different drugs can be proved to be sensitizing substances.

The entire population is vulnerable to artificially induced sensitivity, provided the exposure to the allergic excitant is sufficiently prolonged and excessive. The man-made allergic problem can be anticipated and thereby prevented. However, the spontaneously occurring group of the better known allergic syndromes such as hayfever, asthma, and urticaria are for the most part unavoidable.

The types of undesirable reactions to antimicrobial therapy which can occur are true toxic reactions related to overdosage, sensitivity, and secondary inflammation or ulceration due to superimposed infection. All of the antibiotics are capable of producing allergic reactions. Due to the ever-widening use of antibiotics, particularly those of fungal origin, these allergic reactions are becoming more and more prevalent. Penicillin is one of the major sensitizing agents in this group. It is estimated that 10 per cent of the population becomes sensitive to penicillin. And, as in other forms of drug allergy, sensitization seems to occur most readily from the topical application of the agent in the form of troches, ointments, suppositories, powders, sprayed solutions, or aerosols. The initial sensitizing contact may have occurred without incident, weeks or months prior to the allergic accident. Parenteral administration of even small doses may have been the mode of exposure. The highest degree of allergy occurs to the aqueous suspension.

Allergy of the spontaneous, nonanaphylactic type to insulin is found in those with a personal or familial history positive for food sensitization to beef and pork. Allergic accidents may be caused by organ extracts, such as liver, vitamins, virus vaccines, prepared in chick embryo or egg against influenza, mumps, rabies, Rocky Mountain, spotted fever, typhus and yellow fever, and sclerosing agents of fish origin such as sodium morrhuate. Horse serum has a high sensitizing potential. At least 40 per cent of the population can be sensitized to horse serum, provided a sufficient amount be given.

Spain, W. C., and Fontana, Vincent J.: Allergic Accidents Resulting from Therapeutic Agents, Gen. Practitioner **14**:113-117 (*November*) 1956.

Hodgkin's Disease—Features

The common symptoms noted in Hodgkin's disease are elevated erythrocyte sedimentation rate, neutrophilia, and anemia. Often leukocytes and monocytes are significantly increased as are eosiniphils occasionally. Lymphocytes are almost always

(*Continued on page* 80)

CLINICAL AND LABORATORY SUGGESTIONS

(*See pages* 76 *and* 77)

Form to be Used by Contributors
To: Clinical and Laboratory Suggestions Editor

DENTAL DIGEST
708 Church Street
Evanston, Illinois

From: _____

_____

Subject: _____

Explanation of Procedure:

Sketch:

Suggestions submitted cannot be acknowledged or returned.

$10 will be paid on publication for each suggestion that is used.

reduced in number. Lymphocytosis is rare and is strong evidence against the diagnosis. Eosinophilia may distinguish the disease from acute bacterial infection. Platelet counts are generally normal or slightly elevated.

X-ray therapy is no more efficacious than mechlore-thiamine hydrochloride (nitrogen mustard) in alleviating signs and symptoms. Neither prolongs life. In many patients, however, one form of therapy gives relief while the other does not. Occasionally, treatment is effective at one period during the course of the disease but not at another time. In a few patients, therapy is completely ineffective. Nitrogen mustard may be preferred in some cases because the expenditure of time and money is considerably less than with x-ray therapy.

The average time of survival after the first manifestation of disease is three years but may be as short as five months or as long as ten years or more. Life expectancy after infiltration of the skin is about three months. Survival from onset of illness with manifestation is approxiamtely two years.

Patients with moderate anemia or leukopenia have a life expectancy of about six months. The interval between the onset of illness and death is approximately one year. These signs are not invariably indicative of terminal disease. Patients with slight anemia survive about two years while those with severe anemia after a course of therapy usually survive only six months.

The appearance of pruritus does not necessarily signify progression of the disease. Such patients survive almost three years and seem to live longer than patients without this symptom. Survival from onset of illness is about five years. The situation is similar after mediastinal involvement. These signs are frequently observed in the same patient.

Life expectancy is about one year after extension of disease into lung, bone, liver, or spleen. After the onset of fever, survival is also about one year. Patients with severe leukocytosis live about two years after onset of illness. Those with normal counts survive for a slightly longer period.

Levison, Bernard; Walter, Bruce A.; Wintrobe, Maxwell M.; and Cartwright, George E.: A Clinical Study of Hodgkin's Disease, Arch. Int. M. **99**:519-535 (*April*) 1957.

Skin Changes from Vitamin Deficiencies

Faulty metabolism is often responsible for many of the skin changes associated with inadequate vitamin A intake rather than an actual deficiency in intake. Usually an intake of 2,500 units of vitamin A is adequate. However, some persons require vast amounts of the vitamine to prevent common skin changes, such as xerodema and hyperkeratosis.

Advanced vitamin A deficiency causes many symptoms including: (1) night blindness, (2) dimness of vision, (3) xerophthalmia, (4) keratomalacia, (5) diarrhea, (6) neuritis, and (7) muscular weakness. The signs of early or less-advanced deficiency concern the skin and include dryness and hyperkeratosis. Hyperkeratosis takes the form of dry, firm, tiny papules with central intra-follicular keratotic plugs. Usually the papules are distributed on the extensor surfaces of both upper and lower extremities, the shoulders, abdomen, and back. They may generalize and spare only the hands, the feet, and the axillary and anogenital areas. In these areas, pigmentation and secondary dermatitis may occur.

When the intake of vitamin B_2 (riboflavin) is inadequate skin changes affecting the lips, angles of the mouth and tongue may occur. Cheilosis occurs, with perleche, or painful fissuring at the angles of the mouth. The lips are dry and scaly and at times assume a denuded, raw appearance. The tongue is a magenta color. Often these changes are accompanied by seborrhea of the face, ears, and scalp. A congestion of the cornea sometimes progresses to vascularizing parenchymal keratitis. Photophobia, dimness of vision, and impairment of visual acuity may also occur.

With a deficiency of nicotinic acid, pellegra affects the skin, the alimentary tract and the nervous system. Severe dermatitis may occur anywhere on the body but usually involves the hands and feet, the elbows, the knees, the neck, and the face. Usually the eruption is symmetric and begins as sharply circumscribed plaques of brightly erythematous dermatitis. After several weeks or months these areas become scaly and deeply pigmented. In severe cases, vesicles and wet-type bullae form. As the disease progresses, the areas become atrophic and deeply pigmented. The eruption tends to become worse in the summer and improve or even disappear in the winter months. Characteristic lesions appear on the face and neck. The nose becomes erythematous and develops a fine, grainy scaling. Painful fissures and ulcerations occur on the mucous membranes. The mouth becomes dry and the tongue red and swollen.

Vitamin C plays an important role in the metabolism of the tissues. A lack of this vitamin results in the delayed healing of wounds. This vitamin is important in the formation and maintenance of intracellular matter. The resorption of intracellular substance when ascorbic acid intake is inadequate explains the nature of scurvy lesions. Scurvy is the chief clinical expression of severe vitamin C deficiency. The earliest sign of scurvy is follicular hyperkeratosis. Later, the classic manifestations of hemorrhage appear. Scurvy in infancy is known as Barlow's disease, with not only capillary fragility leading to hemorrhages but also swelling of the distal end of the femur.

Peck, Samuel M., and Palitz, Laurence L.: Common Skin Changes with Vitamin Deficiencies and Endocrine Disturbances, Mod. M. **25**:191-199 (*July* 15) 1957.

Fever

Body temperature represents a delicate balance between heat production and heat loss. This process is under

(*Continued on page* 82)

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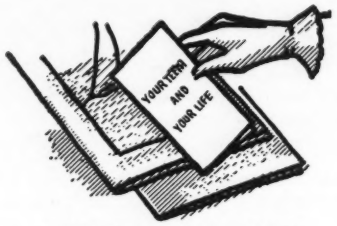

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the control of the temperature regulating center situated in the posterior part of the hypothalamus with possibly another center in a higher area.

A febrile response results when one or a combination of the factors concerned with temperature maintenance is disturbed. There may be increased heat production, decreased heat loss, or faulty central regulatory mechanisms.

Increased heat production is represented by the reaction of the body to products of tissue destruction or tissue necrosis. The classic example is the fever occurring with coronary thrombosis and subsequent myocardial infarction.

The dissipation of heat through the skin is important for maintenance of the normal temperature. Fever may result when there is a decreased loss of heat through the skin.

The presence of a chill, which results from a rapid rise in heat production without a concomitant increase in heat loss, can often be of diagnostic help. It often signifies invasion of the blood stream by bacteria or by protozoan. A chill that follows the entrance of an infective agent into the blood stream occurs 30 to 45 minutes after this event. Since the blood stream has often been cleared of the agent by the time the chill has occurred, blood cultures should be drawn with this in mind.

Fevers of short duration are most prevalent. The etiology of most of these diseases is assumed to be, and correctly so, viral in origin. Most of these patients recover without specific diagnosis.

High fevers of several weeks' duration may be caused by one or more of several factors. These include abscesses, systemic bacterial infections, subacute bacterial endocarditis, tuberculosis, mycotic infections, and viral infections.

The traditionally accepted 98.6° Fahrenheit as the normal temperature represents averages of many determinations. The range for men is 97.1° to 99.1° and for women 98.2° to 99.3°. There is a diurnal rise in nearly everyone.

It is important to complete a thorough investigation on the patient with

a fever of undetermined origin. Each of these patients differs. A careful history and physical examination, repeated at frequent intervals, can go a long way toward solving the problems under discussion.

Michael, Max: The Patient with Fever of Unknown Origin, Gen. Practitioner **16**:74-82 (*October*) 1957.

Tracheotomy

Tracheotomy is rarely, if ever, fatal and the surgical procedure is a simple one. Many patients have died, however, because of hesitancy to perform tracheotomy. Once the operation has been performed the initial problem, high airway obstruction, is still potentially present since the tube may become blocked or it may be displaced. The drying of the bronchial mucosa and formation of obstruction by mucus plugs are also potential dangers.

The procedure should be considered in the following instances: (1) When a patient undergoes surgery of such a nature as to interfere with normal maintenance of the upper tracheal, laryngeal, or pharyngeal airway an endotracheal tube is invariably employed during anesthesia. Tracheotomy should be performed at the conclusion of such an operation prior to the removal of the endotracheal tube.

(2) The patient whose airway is endangered by secretions, either because of pharyngeal palsies or because of excessive secretions associated with pulmonary infection, requires tracheotomy. Patients with poliomyelitis, patients with laryngotracheo-bronchitis, and postoperative patients with suppurative pulmonary disease are examples of this problem.

(3) Patients suffering from chronic laryngeal or upper tracheal obstruction in whom increasing obstruction is a possibility deserve tracheotomy before they get into serious trouble. Tumors in this region, especially if they are to be irradiated and vocal

(*Continued on page* 85)

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We are going to list a few of them for you. Then let us see how Mer-Don 7 stacks up.

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A filling should not harm the pulp; it should be neutral in PH (6.9). **Mer-Don 7 is completely neutral. But silicates are highly acid, even have a PH of 4.5 after they are mixed and hardened for 24 hours. The liquids of silicates are highly acid and would irritate the skin if contact occurred. Mer-Don liquid can be rubbed into the skin with no ill effect, it is so bland. Silicate liquid placed in a deep cavity would be highly irritating and if not counteracted would probably kill the pulp. Mer-Don 7 liquid would do no harm at all. Amalgam is not acid, but its high transmission of heat and cold do not recommend it especially for a filling material.**

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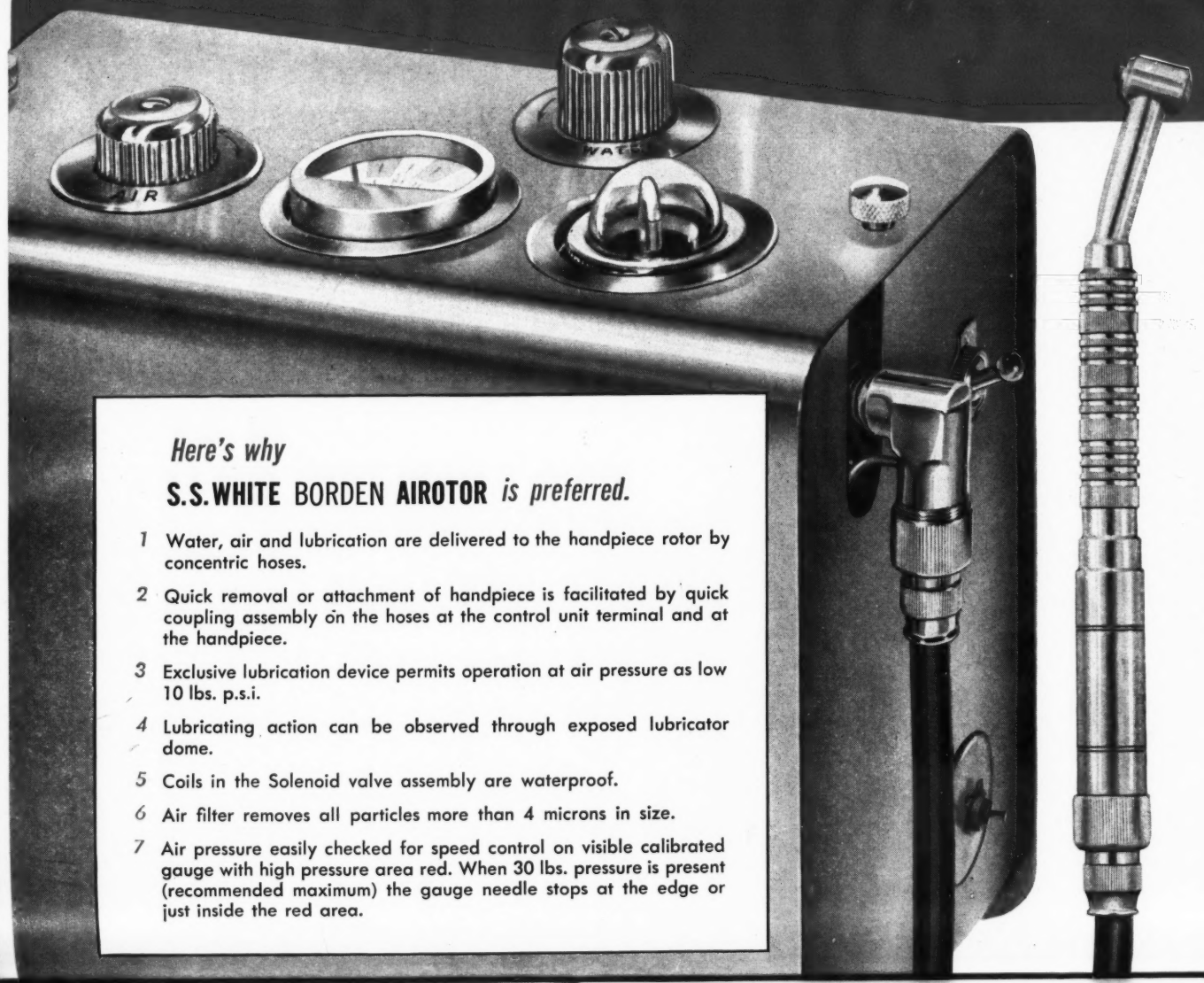

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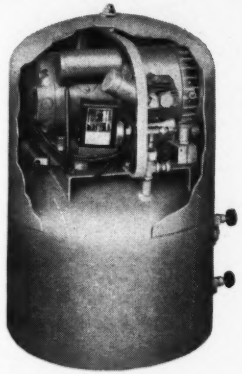

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cord palsy are examples of this category.

(4) Patients undergoing surgery requiring general anesthesia, who suffer from diseases impairing the airway and seriously interfering with endotracheal intubation, must have a tracheotomy under local anesthesia first. Ludwig's angina, massive tumors in the tongue, hypopharynx or larynx, and fixation of the jaw are all examples of this category.

(5) Patients with increasing laryngeal or upper tracheal obstruction associated with a wide variety of other conditions must have tracheotomy before they become exhausted. These patients will exercise every muscular effort to keep their arterial oxygen saturation near normal until total exhaustion is reached. If cyanosis develops one has already waited too long and attempt at tracheotomy may be too late.

It is important to recognize the signs leading to the necessity of tracheotomy. The chest and abdomen are quickly and completely uncovered. If there is a sucking in of the supraclavicular, epigastric and intercostal regions with each respiratory effort high obstruction is present. Unless the condition of the patient is desperate, as evidenced by obvious exhaustion, rapid, thready pulse, or cyanosis, one can afford to institute therapy and watch and wait. Therapy should consist of the administration of highly humidified air enriched with oxygen, if possible. If one is in the patient's home some immediate help may be gained by taking the patient to the bathroom, closing the door and turning the shower on very hot and in full force. One must never wait for the development of cyanosis.

Proctor, Donald F.: Anesthesia and Otolarynology, Baltimore, Williams & Wilkins Co., 1957, pp. 239-250.

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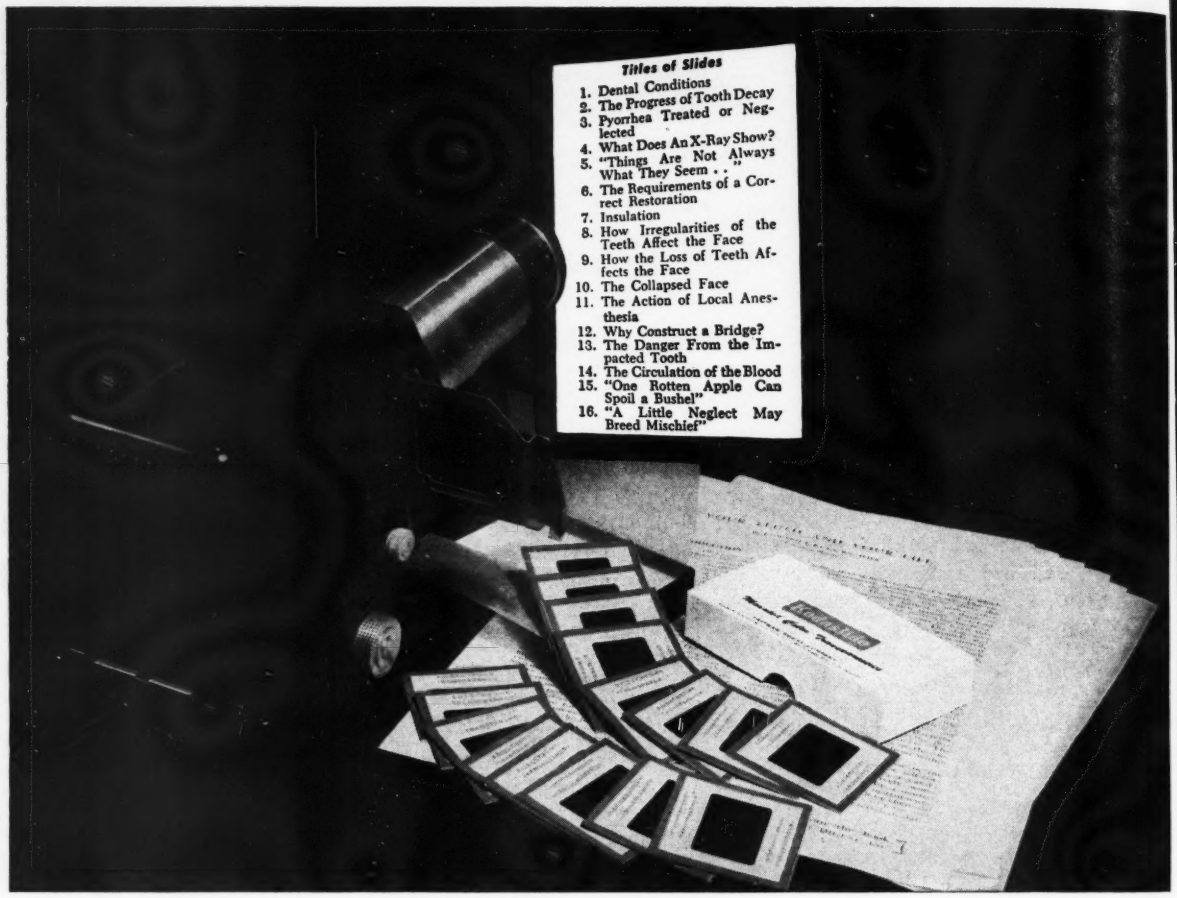
The heat is transmitted through the air from the radiating source which is placed close enough to the surface of the body to produce obvious dilatation of the cutaneous vessels. This causes the skin to turn pink. Although the penetration depth of radiant heat is minimal, heat conduction occurs through the tissues so that, eventually, muscles located a centimeter or even more below the skin may be warmed by the modality.

The therapeutic value of conductive heating is achieved by direct contact with the skin. This type of heat is supplied by hot water bottles, hot baths, hot moist heat, hot fomentations, electric heating pads, and paraffin baths. This type of therapy has the disadvantage of supplying little heat penetration. If heat loss is minimized, however, as with the use of

(*Continued on page* 87)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hot moist heat in a tight compartment, secondary heating of deep tissues may be considerable.

Conversion heating can be produced by at least two different means. One method involves the application of high-frequency alternating currents through the use of long-wave diathermy. This has little practical value. The other method involves the use of short-wave diathermy.

The application of heat consistently produces certain physiologic and metabolic changes. This agent acts as a potent vasodilating stimulus, affecting the capillaries and all components of the arterial and venous systems. As a result, there is a significant increase in blood flow, which may be important in the healing of tissues and the removal of catabolic products.

When used with allowances for its limitations and potential dangers, thermotherapy is one of the most effective therapeutic agents available in physical medicine.

Abramson, David L., and Fleischer, Clara J.: The Uses, Limitations and Abuses of Physical Therapy, Postgrad. M. **21**:280-286 (*Mar.*) 1957.

Anoxia—Developmental Defects

The origins of many developmental defects, ranging from severe handicaps such as cerebral palsy, epilepsy, or mental retardation to less obvious or special defects as deafness, reading disorders, or behavior disorders, are obscure, Genetic or environmental factors cannot always be implicated.

A possible causative factor is brain injury. To account for the diverse phenomena, however, this concept must embrace gross, minimal, localized, and diffuse injuries. Many children possess the defects without evidence of such trauma. Some authorities believe that such children sustain undetectable injury during infancy or the prenatal period when consequences to the central nervous system are difficult to assess.

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(*Continued on page* 88)

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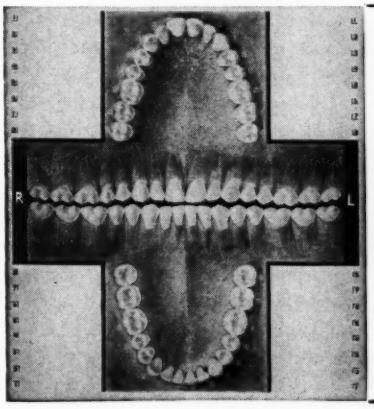

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mechanical birth injury is becoming relatively rare. However, anoxia is frequent. From 5 to 10 per cent of newborn infants have difficulty in establishing respiration after birth and an unknown number experience fetal oxygen reduction. The effects of anoxia on the brain vary greatly and could thus account for diverse behavorial consequences.

Available evidence suggests that perinatal anoxia is either lethal or has no lasting effects but other studies reveal graduations of response. Retrospective investigations of groups with known defects such as cerebral palsy or epilepsy reveal a significantly higher frequency of apnea or other perinatal complication than is expected in the total population. Studies beginning with a documented birth record and correlated with the child's development show apparently causative relation of neonatal apnea to later development defects.

Definition of anoxia poses a difficult problem. Oxygen content of the blood would appear to offer an objective measure of the degree of oxygenation. Oxygen level at birth, however, shows poor correlation with later intelligence levels. Lowered cord oxygen is often transitory, and the effect is often gone at the end of one hour. Blood oxygen saturation is a valid measure at one moment but changes too rapidly to be of practical assistance in long-term prognosis.

Behavior tests allow comparison of groups with known mechanical injury or pre- or postnatal anoxia. The differential effects on test performance of the complications before, during, and after birth are noted. Scores decrease as the number of the complications increases. Scores are lowest with fetal anoxia and highest when only complications of delivery are noted.

The evidence suggests that maternal complications during pregnancy and labor and signs of fetal distress may be valid indicators of intrauterine anoxia. Reduction of the oxygen supply during fetal life is deleterious to the infant, since longer and perhaps profound periods of anoxia can occur undetected without the possibility of any therapy. However, a large number of infants with anoxia do not show impairment. The protective factors that insulate these infants are unknown.

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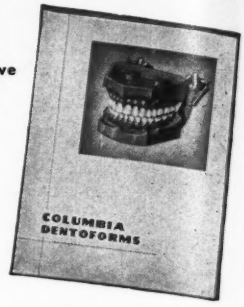

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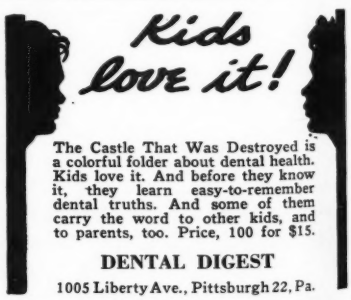
Graham, Frances K.; Caldwell, Bettye M.; Ernhart, Claire B.; Pennoyer, Miriam M.; and Hartmann, Alexis F.: Anoxia as a Significant Perinatal Experience: A Critique, J. Pedia. **50**:556-569 (*April*) 1957.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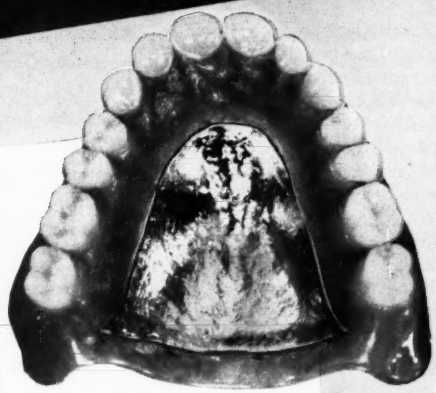

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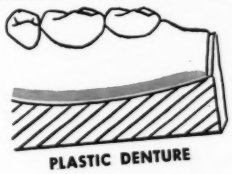

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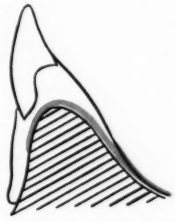

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When my eldest daughter and her husband left The Cradle with their new daughter a fuller life began for the three of them. There is something special about adopting parents: they have deliberated and chosen a child; they are entirely aware of their responsibility; they have entered into a pact with God and a Court.

Parenthood has diverse shadings. There are a few cruel and indifferent parents. Most are self-sacrificing and enjoy a sublime experience. Those who through a voluntary act of the Will have chosen parenthood by adoption are doubly blessed.

Grandparenthood is a different kind of experience. Here we have the joys of watching a child develop without the day-to-day trials of routine and responsibility: the measles and the bruises; the disappointments and stresses at play and in school; the disorder in the home and the robust noises. So it has been our experience with our other four grandchildren.

In the 35 years since The Cradle was founded approximately 8000 children have been placed for adoption. Some are now the children of people who are high in the affairs of the nation. Most are the children of good earnest people whose greatest claim to eminence is in the warmth of their hearts and in their love.

The Cradle is *not* a clearing house to dispose of unwanted infants. It is an institution that places children in homes after full and careful interview and investigation. Wealth need not be held by adopting parents, but love must be. No child is placed in a home to satisfy some passing whim or as a symbol of pride. No child is entrusted to worthless persons.

Human lives are not bartered in a market place. The richest person in the world could not buy a baby from The Cradle. That is an inviolable principle. To become adopting parents a couple must prove that they are trustworthy and prepared for parenthood. *Natural* parents are not required to pass such exacting tests!

There is a time-lag for full investigation and sociologic appraisal between submitting an application to The Cradle and the momentous "call." When "*the* call" came to my daughter and her husband they hastened by plane to Evanston. They came heavy with baggage. Not with things for themselves, but with crisp and shiny new things for the baby: clothes, blankets, diapers, bottles.

Our home was ready. One of the new aunts (herself a mother of three) had prepared a bassinet. My wife and I had assigned ourselves to the laun-

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New Developments in Myerson's Dura-Blend Plastic Teeth

UNDETECTABILITY NOW ACHIEVED WITH FACILITY EVEN IN PARTIAL DENTURES

New Shades Improve Matching Accuracy

Shade matching accuracy is always important but in partial dentures it is critical. A development project was set up to further advance the present superiority of Dura-Blend plastic teeth in this respect.

The first step was to make a master shade guide composed of all the principal tooth shades available. Patients were examined for closest match possible with this master shade guide. It was demonstrated that by the addition of three new shades, the Dura-Blend shade guide offered first choice for accuracy of match more often than any other — in fact, exceeding by 44% the brand scoring second. These new Dura-Blend shades are composed of one quite bright and light, one similar but darker and one quite grey.

13 New Moulds

The new moulds introduced with Myerson's AEsthetic porcelain teeth successfully combined naturalness with cosmetic effects. To offer the same facility in plastic teeth, ten of the most popular upper anterior forms were chosen to be added to the present beautifully carved and characterized Dura-Blend moulds.

Wider Range Increases Convenience

These moulds also will be useful where the following features are indicated:

1. More subtle labial carvings.
2. Slender forms.
3. Longer ridge lap (see Figure 1).

Four of the new upper moulds are square in outline. Three lower moulds, short in relation to width, have been added to increase convenience.

Tested for Detectability

Naturalness is often claimed for artificial teeth without any proof whatsoever. It was decided to actually *test* Dura-Blend teeth for this very important feature.

Representative Dura-Blend teeth were used in an anterior partial. The surrounding natural teeth were characteristic in appearance of good health and good dental care.

Figure 1. Dura-Blend now offers choice of profile (A) Characteristic of new moulds; (B) Typical of many existing moulds.

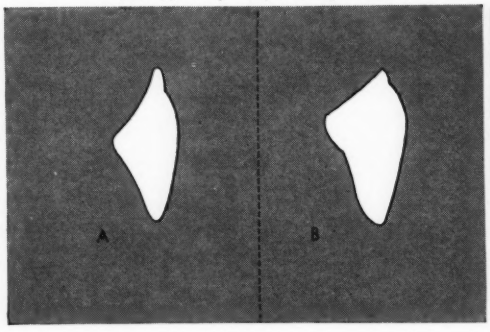
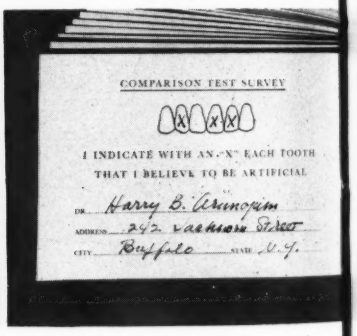


Figure 2. Forms used to record dentists' choices in detectability test.


COMPARISON TEST SURVEY
I INDICATE WITH AN "X" EACH TOOTH THAT I BELIEVE TO BE ARTIFICIAL
DR. Harry B. Arrington
ADDRESS 242 Jackson Street
CITY Buffalo STATE N.Y.

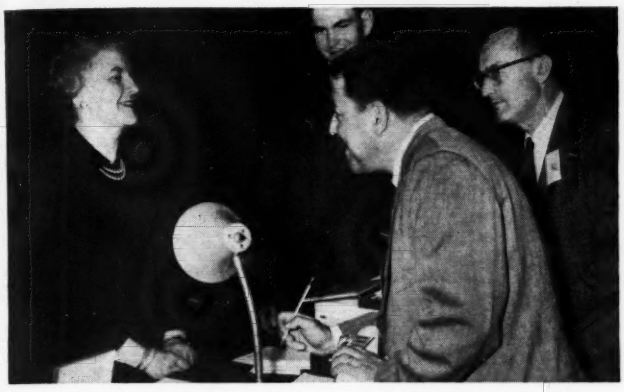


Figure 3. Dentist examining patient at close range in Dura-Blend detectability test.

The patient was displayed at the 1958 meetings of the Dental Society of the State of New York, the Massachusetts Dental Society and the Ontario Dental Society.

Lights were placed so as to give 100 foot candles illumination on the teeth. All dentists attending these meetings were eligible to participate. The patient was placed so that an examination by the dentist with his eye two feet from the patient's teeth was comfortable. The dentist was given a card on which to indicate which teeth were artificial (see Figures 2 and 3).

Results

The results of the test were tabulated separately for each of the meetings. They were so uniform that it became clear that the total for the three meetings was a statistically significant result within the limits required for this test. The results are in Table I. An answer was considered correct when the participant correctly indicated the artificial and the natural teeth. No allowance was made for chance correctness, although many participants commented that they were just guessing.

Table I

Meeting	No. of Participants	No. of Correct	% Correct
Boston	138	11	8.0
Buffalo	112	14	12.5
Toronto	104	13	12.5
TOTAL	354	38	10.7

It is safe to conclude that teeth scoring as shown, under the severe conditions described, are actually *undetectable under ordinary conditions.*

Maximum Satisfaction with Dura-Blend Anterior Teeth

With undetectability, plus the superior facilities for shade match plus greater convenience of the amplified range of shapes and sizes, maximum satisfaction for both the dentist and the denture patient is now attainable by the use of Myerson Dura-Blend Anterior Teeth. Their durability is still unequaled and is backed by a record of ten years of successful use in hundreds of thousands of cases all over the world.

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dry detail. Our kitchen shone as formidably as a surgery. Everything was arranged for the aseptic compounding of a formula and for the surgery-exact sterilization of the bottles.

I am sure that the dedicated people at The Cradle do not expect a family influx when adopting parents appear, but my wife and I went along anyway. We were graciously welcomed. The adopting parents were taken to a nursery. There they were required to scrub and dress in surgical mask and gown. A nurse brought the baby to them. The three were left alone. A new life and a new family began at that moment.

Shortly the new family came to us. Our youngest grandchild was spic-and-white in her first "dress-up" clothes. She looked like a child that had been born of the flesh to these young parents. She smiled, or so I wish to believe, and then another member of the family group entered our hearts on equal status with all the others.

For five days the three happy people were with us. Aunts and uncles, cousins, friends and neighbors came with their good wishes and with their gifts. A baby ruled a household—benevolently. The washing machine whirled at all hours, the clothes line was ever crowded, meals were strange and irregular—except for Laura's.

Our baby was in magnificent physical condition from the care that she had received at The Cradle. No diaper rash, no bowel disturbance. Her hair shone from care, her finger nails were immaculate and white. She slept the full night through. She ate well and on exact schedule. There is seldom a baby that has spent her first two months with natural parents that has such a good start in life: firm muscle tone, clear eyes, and that fresh *smell* of health.

Then we went to Court—all five of us to be assured that she had an attendant at every instant. The attorney

(*Continued on page* 92)

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who represented the family in the adoption proceeding is himself the godfather of the new mother and my devoted friend since we entered first grade more than a half-century ago.

In the courtroom were other adopting parents that day. There were infants and young children. They were people from all areas of life and from many origins. I felt a profound surge of pride to see these magnificent people who were giving something of their own lives to make a home for a child of God. I recall the wisdom of the creed of The Cradle: "True parenthood is a spiritual relationship which begins when husband and wife voluntarily seek and accept responsibility for directing and cherishing a baby's spiritual, physical, and mental life. It continues as a stewardship during the life of parents and child, with love at its core."

After five days the bassinet was empty and the house was deep in that peculiar kind of silence. The new family had returned to their own home to put down their roots and expand their lives together.

The other aunt and her son live far away so they have not yet met their niece and cousin. But the younger aunt holds high honor in *absentia* by being chosen as the godmother.

Today we had a letter from the new family. It began "Life is grand." What more could anyone ask or say?

—E. J. R.

Clinical Uses of Ultrasonic Root Scalers

S. J. EWEN and P. J. TASCHER

New Developments

Among more recent developments in instrument design and clinical application in root scaling with ultrasonic vibrations, the tool type has been devised in a functional form to meet the structural requirements of the tooth within the surrounding periodontium.

Description—These ultrasonic root scalers meet the following requirements: (1) They are 10-millimeters long, exactly the length of a periodontal probe. (2) They are marked at 2-millimeter intervals to aid in transposing the original pocket depth measurements. (3) They vary in shape in order to have comfortable access to all root surfaces. (4) They taper from the hub end to an approximately ½-millimeter edge at the working tip. (5) They are hollow ground and in cross section from a figure 8. The blunt working tip is concave.

Uses—When a fluid is continuously fed to a vibrating tip with this design, it is possible to remove surface stains, supragingival, and subgingival calculus. An automatic fluid delivery device propels water and/or antiseptic solutions necessary for the dislodgement of accretions.

Adapted from *Journal of the Western Society of Periodontology* **6**:56 (June) 1958.

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Measurement in Medicine

MAX HAMILTON, M.D., London

Conclusions

Clinical observation has been the foundation of medicine, both in research and practice. It still is. It is a method which is liable to error, but so are all observations, however made. In recent years much attention has been paid to "observer error," whose presence has been mistakenly assumed to invalidate the method of clinical observation. Observer error can be diminished to any required degree by suitable techniques, as can any source of error of measurement. The value of clinical observation in research and in clinical medicine will increase, not diminish, as the methods of handling its limitations become more widely understood and utilized. The day is far distant, if it will ever be reached, when reading from machines will supersede clinical observation.

From *Lancet* **7028**:982 (May 10) 1958.